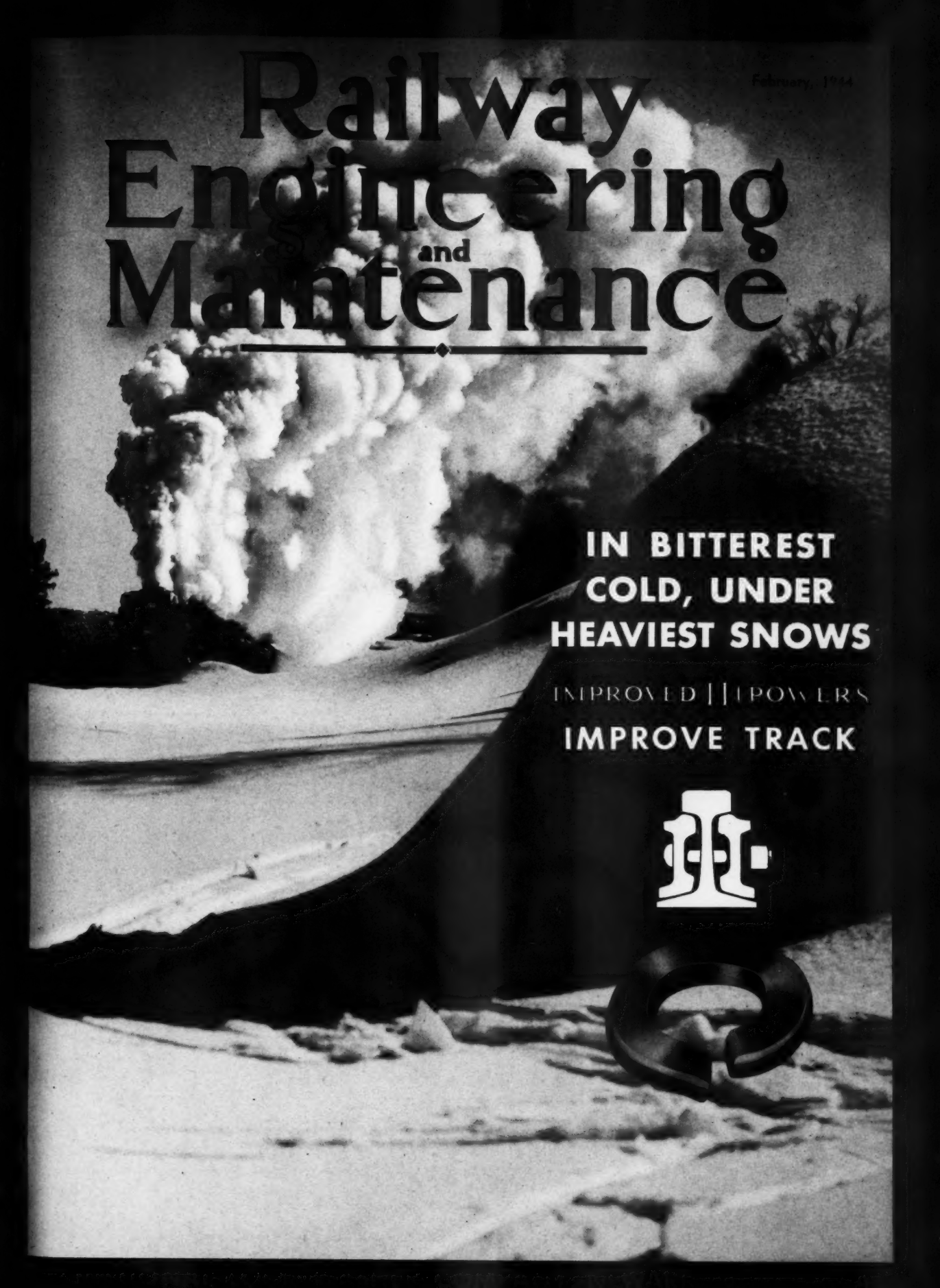
February, 1944

Railway Engineering and Maintenance



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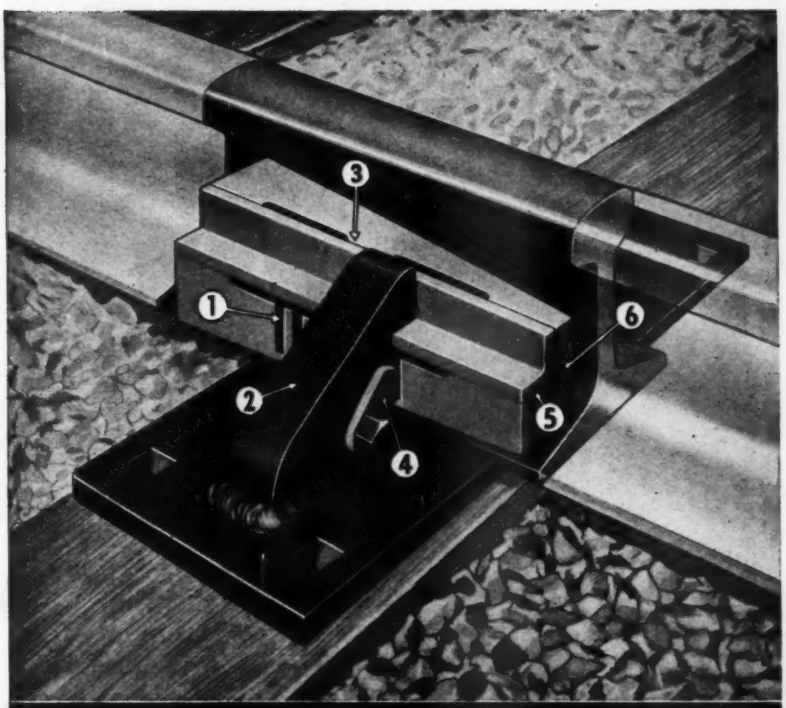


1. Slots permit 1/16" adjustments.
2. Brace welded to switch plate.
3. Spring compression stop.
4. Pawl for locking wedge.
5. Spring steel welded to wedge.
6. Wedge shaped for contact on web and flange of rail.

Here's better rail bracing for turnouts

Is your rail bracing at turnouts good enough for wartime's heavier loads and higher speeds? If there's any doubt about it, give Bethlehem's Spring Rail Brace a trial.

This improved rail brace has extra strength and many other worthwhile features. It is a simple, adjustable, wedge-type brace. It has only two parts. One part is a combined rolled-steel switch plate and brace, the brace being heavily welded into a machined slot in the plate. The other part is a specially-shaped wedge on which is welded a heavy angular spring-steel piece.

As this wedge is driven parallel to the rail, pressure is exerted against the web and flange. The compression of the spring, which will withstand 12,000 lbs. pressure before closing, provides considerable resilience for full recovery from side thrusts of the rails. It also maintains constant pressure on the rail, preventing track vibrations from loosening the wedge.

As an added safety feature, a pawl attached to the brace can be engaged in one of many slots on the side of the wedge when the wedge is driven into place, thus holding the wedge in position and maintaining spring wedge in any desired state of compression.

No special tools are needed to install or adjust the Bethlehem Spring Rail Brace. A spike maul or hammer is all that's needed. And this Bethlehem brace conforms to all A.R.E.A. standards.

Find out more about this strong, safe, long-lasting rail brace. Get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

THE TALE OF THE FROG

. . . and the welder's arc

Once upon a not-so-long-ago time this frog was very happy. He lived on the main line and was on excellent speaking terms with high stepping limiteds and fast freights alike. Then came the war traffic. Our frog at first suffered in silence. But things got worse, and his aches and pains became almost unbearable. Finally they had to call in the "Doc."

Now "Doc" knows his frogs and his crossings. He gives froggie a couple of thumps here and there, and then says dejectedly—"this baby's got 'em* bad. What'll I do? The line's got to stay open. There's a big troop movement on and the Generals wouldn't like it a bit if I jimmied up their war." Doc hesitates a minute, then a broad smile spreads over his weather-beaten pan as he says: "This is a job for Morrison Metalweld. They'll operate right at this baby's bedside...fix him up without slowing the war a bit. Hey, Joe—CALL MORRISON."

MORRISON METALWELD PROCESS, INC.
A SUBSIDIARY OF
MORRISON RAILWAY SUPPLY CORP.
EXECUTIVE OFFICES . . . BUFFALO 12, N. Y.
CHICAGO 4, ILL. BIRMINGHAM 3, ALA.

* A more TECHNICAL DIAGNOSIS would be "cracks, soft spots and crushed areas" in the casting. Because of the very nature of high manganese steel, defects such as these are often not detected even under the most rigid foundry inspection.

Report To Our
RAILROAD CUSTOMERS

We are happy to report that we are shipping more Devil Line Railroad Tools to you—our railroad customers—than ever before.

We point with pride to this performance because, as you well know, the Armed Forces have taken the lion's share of our normal production. But, we knew that the railroads faced the toughest job of all times, too, and we pledged ourselves to give you as much help as possible.

Increased capacity, of course, was the answer to the combined demands of the military and our regular customers. On that score we are proud to report that shortly before the "Day of Infamy" we moved into a round-the-clock schedule and we still operate on that basis.

WARREN TOOL CORP. - WARREN, OHIO

ALL SET FOR TROOPS AND SUPPLIES

...WHEN BARCO TYTAMPERS MAINTAIN THE RIGHT OF WAY!

Another Barco product—
FLEXIBLE BALL JOINTS
for the transmission of
fluids where movement is
required.

Another important use for Barco Hammers; they help America keep its vital wartime rail arteries in tip-top condition... with a minimum of precious manpower. They do a more effective, a longer-lasting job than other methods! Railroads will welcome the news that larger quantities of Barco Tytampers are now being made available... to pitch in with the thousands of Barco Gasoline Hammers already pressed into service. Barco Manufacturing Company, Not Inc. 1805 Winnemac Ave., Chicago 40, Illinois.

BARCO PORTABLE GASOLINE HAMMERS
FLEXIBLE BALL JOINTS

Only nine lives? Phooey!

Nine lives are *nothing* to Harcote. For there's no limit to the number of times Harcote can give new life to wearing parts. And now, with repair parts so difficult to obtain, Harcote is doing it every day, as the No. 1 best bet to keep machines on the job, producing for Victory.

For hard-surfacing parts subject to wear and abrasion, Harcote is the ideal electrode. Its deposited metal has moderate work-hardening properties and "as welded" has a hardness of approximately 50 Rockwell "C".

Use Harcote for welding on carbon steel, low alloy and high manganese surfaces. See your P&H representative for information and procedures, or write us.

P&H

The P&H line of Alloy-Electrodes is complete. It covers all needs for hard surfacing, resistance to wear, impact and abrasion, for welding stainless steels, 4-6% chrome steels, armor plate, etc. Send for literature.

P&H also builds a complete line of A.C. and D.C. Arc Welders. Write for full information. Early deliveries possible.

General Offices and Factory:
4606 West National Avenue, Milwaukee 14, Wis.

HARNISCHFEGER
CORPORATION
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

COMPRESSION
Rail Anchor Fastenings

Provides two way holding of track with assured efficiency and economy.

THE RAILS COMPANY

WASHINGTON, D. C.
—
CHICAGO

General Office
178 GOFFE STREET
NEW HAVEN, CONN.

HOBOKEN, N. J.
—
ST. LOUIS

GET RID OF WATER POCKETS

...this easy, positive way

Water pockets *in your roadbed* mean money *out of your pocket.*

You can eliminate these maintenance costs by using strong, tight-jointed ARMCO Perforated Pipe. Naturally your best insurance is to install this durable pipe when the roadbed is constructed. But if water pockets have formed in your present roadbeds, proper use of perforated pipe will give you quick, efficient drainage (see cross-sectional drawing).

Test holes will determine the extent of the pockets. Perforated pipe subdrains, at 15 to 30-foot intervals, are placed below the pockets on a minimum grade of 0.3% and backfilled with graded pervious material.

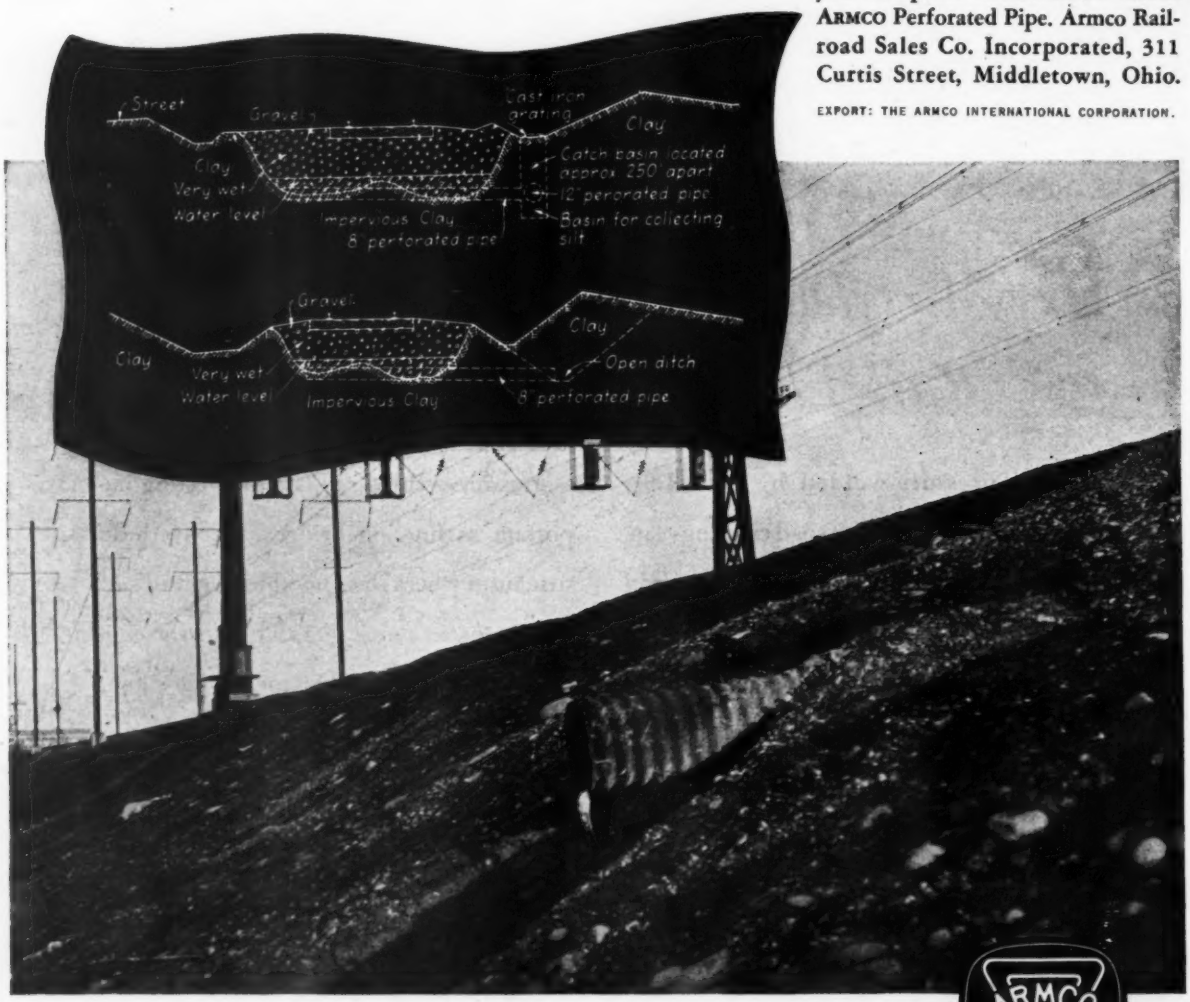
This subdrainage system will sharply reduce maintenance costs and keep the roadbed firm and dry. And it will stay that way. ARMCO Perforated Pipe has a base metal of durable ARMCO Ingot Iron, galvanized for extra protection and long life. The flexible, corrugated metal design and strong joints resist crushing and disjointing. Heavy loads, high speeds, and severe frost heaving will not affect the system.

REMEMBER IT FOR FUTURE WORK

Because of the war, even railroads may be unable to get as much ARMCO Perforated Pipe as they would like. If you can't, remember it for the future work that will be needed to restore your war-beaten roadbeds to peak efficiency.

The ARMCO Man will gladly give you complete information about ARMCO Perforated Pipe. Armco Railroad Sales Co. Incorporated, 311 Curtis Street, Middletown, Ohio.

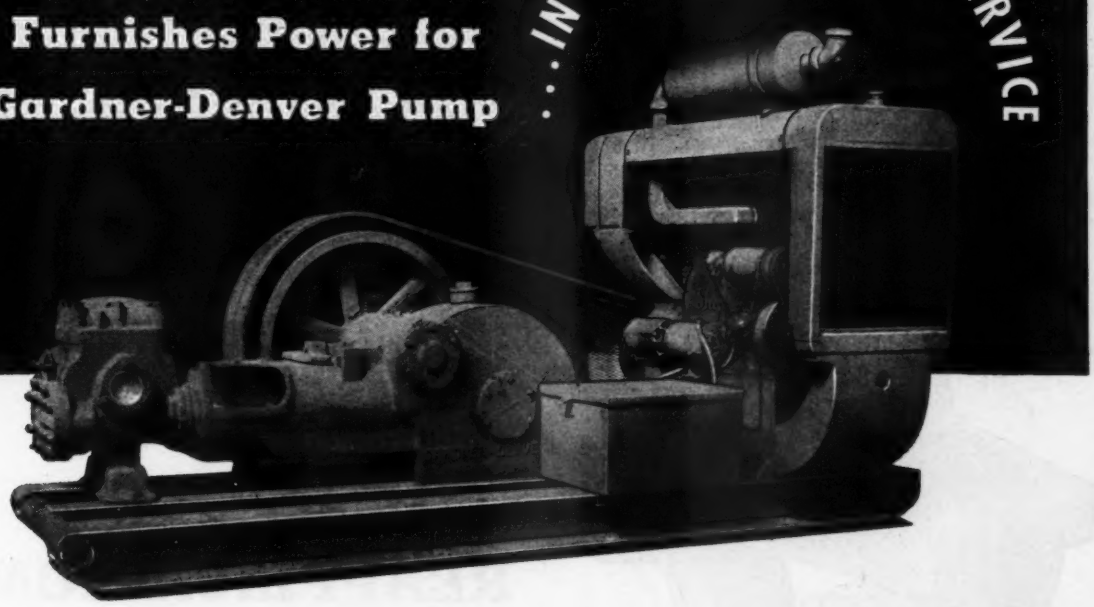
EXPORT: THE ARMCO INTERNATIONAL CORPORATION.



ARMCO PERFORATED PIPE

THESE "CIVILIAN SOLDIERS" FORM A RELIABLE COMBAT TEAM

Sheppard DIESEL Furnishes Power for Gardner-Denver Pump . . . IN RUGGED FOREIGN SERVICE



WITHOUT the aid of a dependable power unit, Gardner-Denver pumps couldn't provide the steady, dependable operation necessary for gruelling military and lend-lease service. Pumps and power units must both be built to stand the terrific punishment of continuous duty—pumping oil, water, kerosene, etc., under conditions which are encountered only in wartime.

The precision-manufactured Sheppard Model 6A Continuous Duty Diesel which powers the 95 GPM unit shown above will develop 25 H.P. at 1200 RPM . . . 24 hours a day . . . seven days a week.

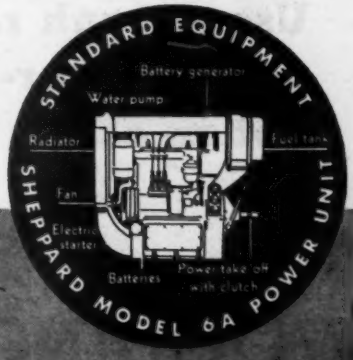
Oil cooled pistons, hardened, replaceable cylinder liners, 4% (closer if required) governor regulation device—products of skillful engineering—make Sheppard Diesels the most economical source of power to use and maintain. The simplified Sheppard fuel injection system is added insurance of continued efficient operation.

Sheppard Diesels are delivered complete according to specifications . . . ready to run without makeshift additions. They are compactly designed for easy installation in new equipment or to convert more costly, less efficient power installations to the economical use of Diesel.

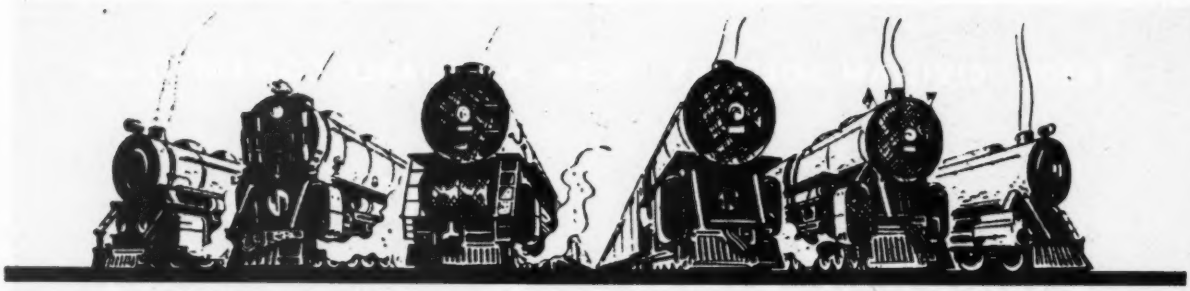
☆ ☆ ☆

While we, too, are devoting most of our energy to the war effort, we are looking forward to the time when we can again supply enough engines to meet the demands of our customers. In the meantime, Sheppard engineers will be glad to plan your post-war power requirements with you. Write for information and illustrated data sheet on the Sheppard Model 6A today.

R. H. SHEPPARD COMPANY, HANOVER, PA.



Sheppard ALL AMERICAN DIESELS



Woodings Rail Anchor

HIGHEST REAPPLICATION VALUE

A WORD OF CAUTION

Use enough rail anchors to prevent all creepage. ***Under-anchored track is a liability, not an asset.***

W

WOODINGS FORGE & TOOL CO.

VERONA, PA.

POWER THAT "DELIVERS"

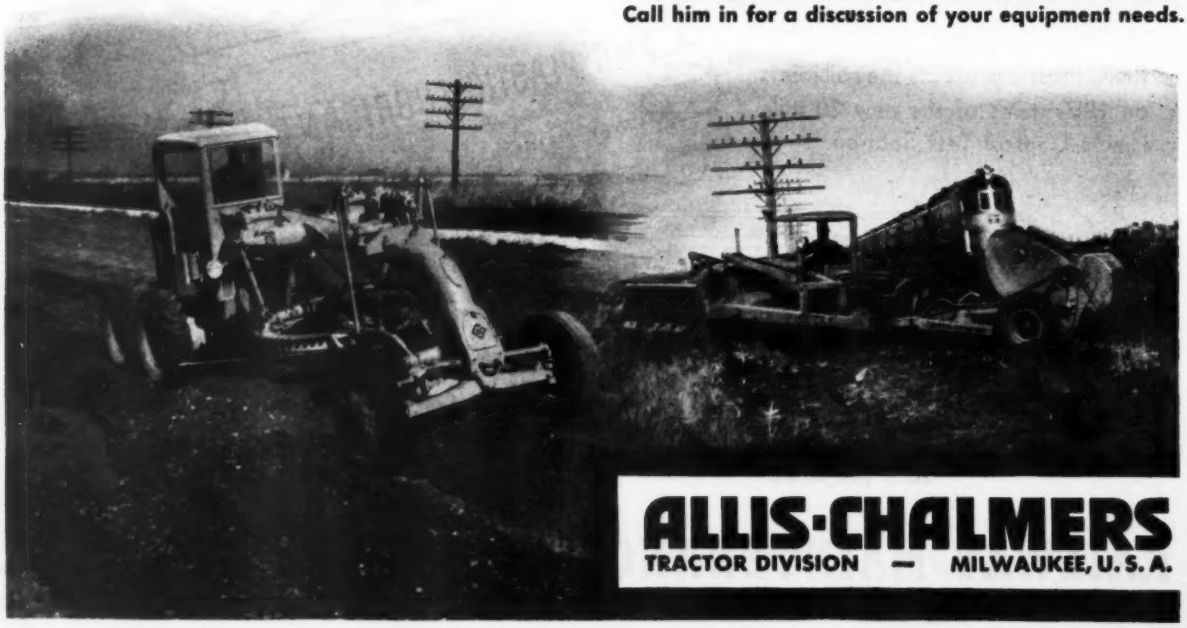
. . . . ON OFF-TRACK WORK

Today's exacting train schedules call for power that works free of the tracks—that handles right-of-way construction and maintenance without interference to traffic... stays on the job and delivers more output per hour of work. Allis-Chalmers off-track equipment fully meets these requirements.

2-Cycle Diesel tractors start instantly, work at high speeds, handle tough going with less gear-shifting. 200-hour truck wheel lubrication saves on downtime—gives you extra man hours, more output per shift.

Built to keep pace with the powerful, fast-moving 2-Cycle Diesel tractors are bulldozers, scrapers, snow plows and winches—all handled by your Allis-Chalmers dealer. Front-end tractor-shovels, wheel tractors with mower attachments, motor graders and power units are all part of his line.

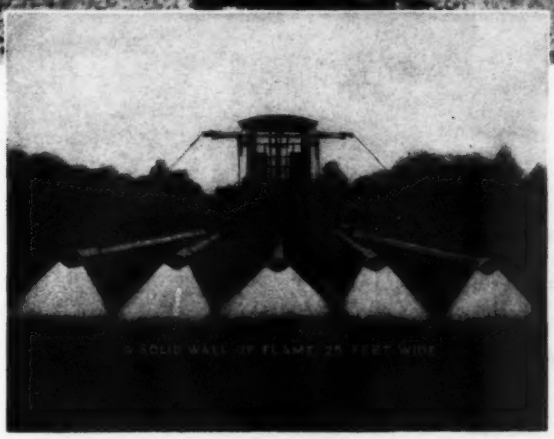
While some off-track units are temporarily out of production, new 2-Cycle Diesel tractors may be obtained if you qualify under government regulation. Fifteen per cent of our crawler tractor production is released for essential civilian use. If you need machines not manufactured at present, your A-C dealer may be able to furnish you with good used units. Call him in for a discussion of your equipment needs.



ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE, U. S. A.

The World's Fastest Trains

Operate Over Weed-Free Track



Woolery 5-burner in operation

Other Woolery Maintenance Units

Woolery Tie Cutters and Creosote Sprayers are in use on many railroads, maintaining track the modern way, with minimum expenditure of labor, time and money.

Just as the Burlington's fleet of 14 Zephyr trains is establishing new standards in passenger service, the Burlington's fleet of modern Woolery Weed Burners sets new standards for the destruction of vegetation thoroughly and economically in the tracks over which these trains run.

In addition to the Burlington, more than 75 other railroads are relying on Woolery Weed Burners in these difficult days, to destroy vegetation in track quickly and efficiently and with minimum man power.

Woolery Weed Burners are available in 5-burner, 3-burner, 2-burner and 1-burner models.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

TIE CUTTERS • SWITCH HEATERS • MOTOR CARS

RAILWAY WEED BURNERS • BOLT TIGHTENERS

Chemical WEED CONTROL

A STANDARD LABOR-SAVING METHOD

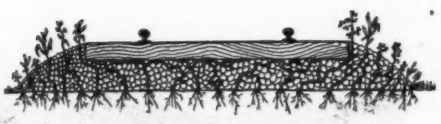
ATLAS "A" ARSENICAL

ATLACIDE CHLORATE WEED KILLER

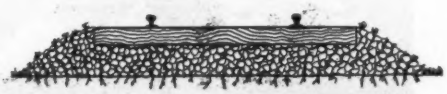
RAILROAD maintenance engineers everywhere realize that chemicals provide the answer to the weed problem. The old-fashioned, inefficient hand-weeding methods are an expensive and purely temporary remedy.

ATLAS "A" or ATLACIDE kills roots with a resultant reduction in the amount of weed growth with each treatment. As weed growth disappears, track conditions are improved, less chemical is required and maintenance costs are reduced. The ultimate goal of clean track maintenance at a minimum cost is soon reached.

The use of ATLAS "A" or ATLACIDE to eradicate weed growth allows maintenance men to concentrate on other important work necessary to a well maintained track.



Before Treatment



After Treatment—ROOTS DIE

Final Result—CLEAN BALLAST

CHIPMAN CHEMICAL COMPANY, INC.

BOUND BROOK, NEW JERSEY

Chicago, Ill. • Palo Alto, Calif. • Houston, Tex. • No. Kansas City, Mo. • Winnipeg, Can.

AIRCOWELDING of worn rail ends speeds up vital track maintenance, conserves new rail and keeps war materials moving on schedule.

Airco R. R. X welding rod used for building up worn rail ends produces joints more wear-resistant and with a higher Brinell hardness than when new.

Airco R. R. X rod can be secured through any Air Reduction office.

Our Engineering Department can furnish complete information on Airco welding of worn rail ends and other welding operations which are helping the railroads in essential maintenance of way work.

BUY UNITED STATES WAR BONDS

AIRCO WILSON

AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

Offices in all Principal Cities

Sewage Flow *INCREASED*

from
4,000,000 GPD
to
12,000,000 GPD

Pittsburgh Pipe Cleaner Service Can Help You Restore Sewer Pipe Efficiency.

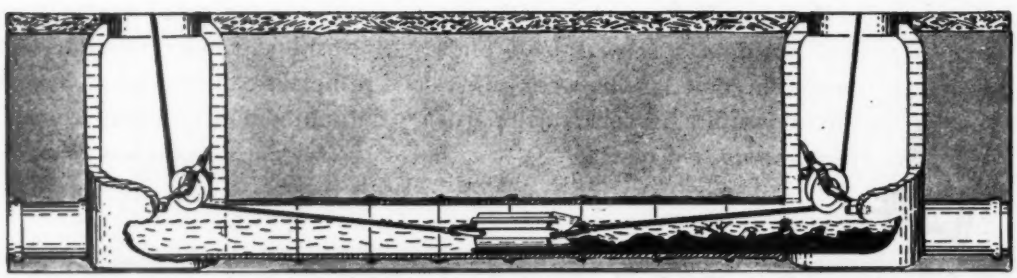
With labor scarcity more acute than ever before Pittsburgh Pipe Cleaner Service is helping many railroads to quickly and economically solve the problem of removing sludge and other foreign matter from clogged sewer lines.

Pittsburgh Pipe Cleaner Service offers a complete engineering and contracting service for cleaning sewers, water mains, water lines, tubes, etc. Specially designed, rotary electrically driven tools, in the hands of trained service men, make every job (including very hard deposits in up to 12" pipe) a simple routine cleanup for Pittsburgh Service.

We make your old pipes practically as good as new by the modern Pittsburgh Pipe Cleaner Service method.

A TYPICAL CASE HISTORY

In a recent Pittsburgh Pipe Cleaner job for an eastern steel plant, we cleaned a 30" sewer and, by removing deposits from the line, increased the flow from 4,000,000 GPD to 12,000,000 GPD.



PITTSBURGH PIPE CLEANER COMPANY
433 Melwood Street **Pittsburgh 18, Penna.**

In 1817, the Steamboat "Washington" made the first round trip from the Falls of the Ohio to New Orleans in 41 days—a record breaking achievement for those days, while today the railroads span the continent in less than a hundred hours. While such boats as the Creole

DRIVE . . .

The Drums of Progress in American transportation have always beaten out an urgent, compelling, staccato tempo—Do it better! Do it cheaper! Do it FASTER!

The river steamboats contributed a colorful phase to the impelling drive of the nation's need for faster, better movement of people and freight. But soon the railroads were proving a faster, more efficient and more economical vehicle. The steel streams could flow in any direction, every month in the year, move loads at greater speed, and were less expensive for the growing republic. While the government must burden an entire nation with the exorbitant cost of waterways maintenance, the young railroads, developed by private enterprise, shouldered their own burdens of up-keep. Their evolution provided America with the effective means of conquering a continent.

Today the American Railroads are fulfilling their destiny in a splendid manner, and we find them rising to increased demands with astounding performances. Efficiency of operation in carloading and use, as represented by average miles per car per day, has increased 89% since World War I; freight schedules in many instances equal the passenger schedules of twenty-five years ago. With incredible speed and proficiency, the railroads of America have brought their facilities and men together for the protection of the progress they fostered.

The perfecting of roadbeds has had to keep pace with the development of equipment and its more efficient use. Without the scientifically constructed roadbeds, ballast and modern steel rails, maintained by eternal vigilance and adequate equipment, the incredible records per-

OF ALL THE CARS IN SERVICE TODAY

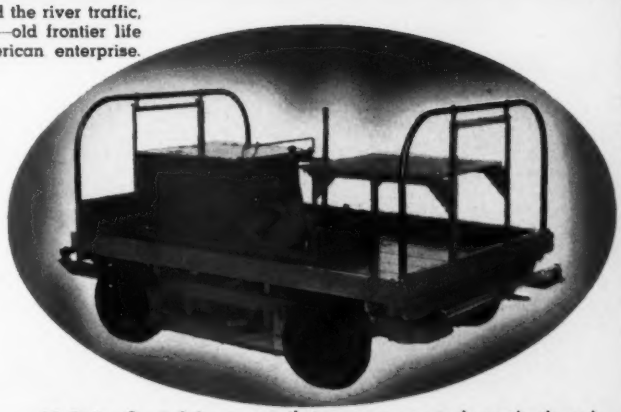
Belle provided a hitherto unknown luxury, step by step the railroads reduced the river traffic, and by the end of the nineteenth century the steamboat's work was done—old frontier life had given way to the onrushing tide of change, brought about by American enterprise.

formed could not have been accomplished. To aid the railroads in handling their important maintenance work, Fairmont has specialized—for more than 35 years—in the design and manufacture of dependable, efficient, safe motor cars and work equipment. Fairmont Railway Motors, Inc., Fairmont, Minnesota.

Fairmont

RAILWAY MOTOR CARS

Performance ON THE JOB COUNTS

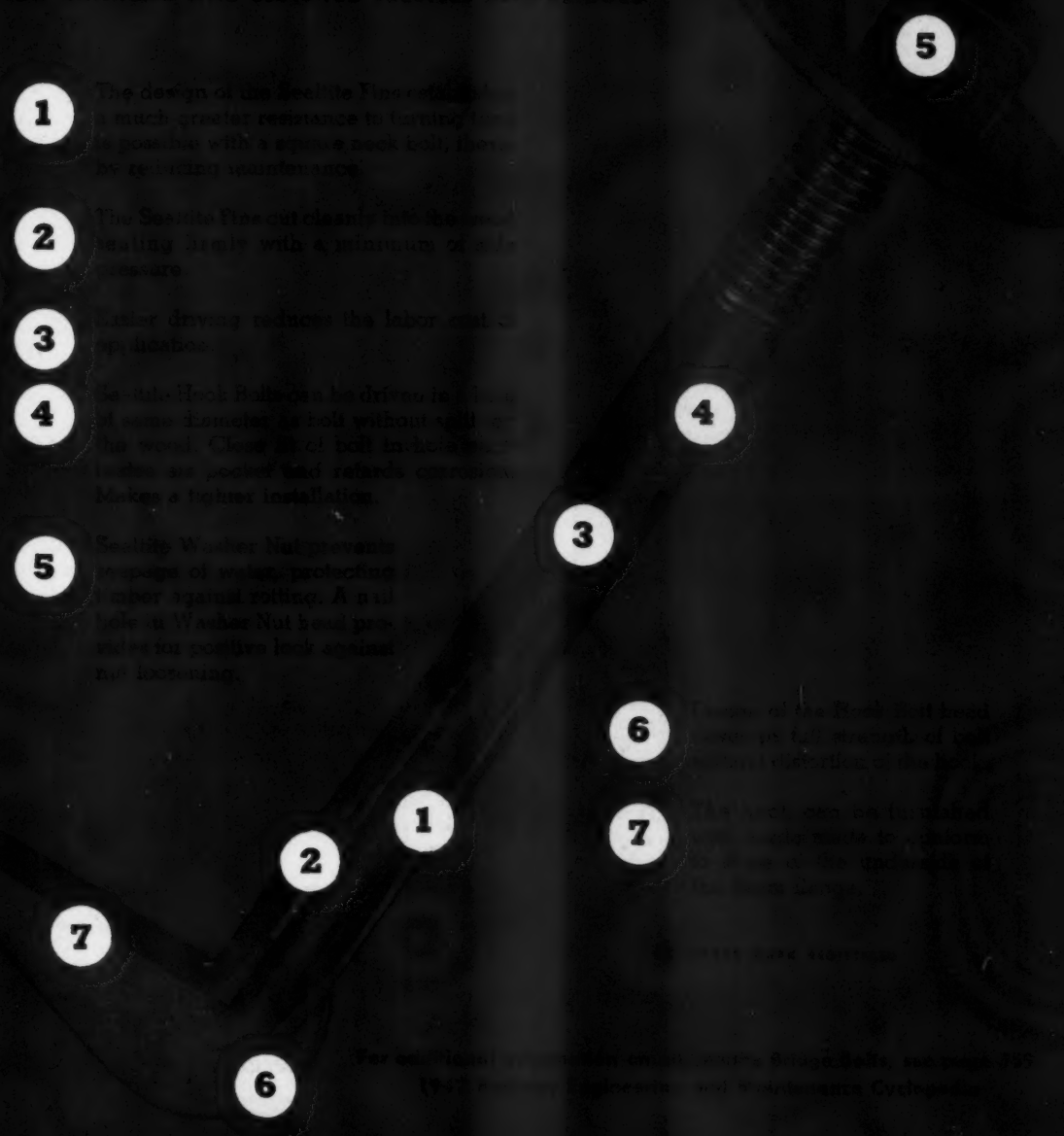


A5 Series C—A 3-8 man car that measures up to heavy loads and tough grades. 36 H.P. 4 cyl. Waukesha Engine and 4 speed (forward or reverse) transmission for smooth performance. See Bulletin 385.

. MORE THAN HALF ARE FAIRMONTS

SEALTITE

HOOK BOLT



LEWIS BOLT & NUT COMPANY

OFF-TRACK CRAWL-AIR COMPRESSORS KEEP TRAFFIC MOVING

The pictures show the surfacing of a track renewal job on a western railroad. Two Ingersoll-Rand 16 tool Crawl-Air Compressors, one on each side of the track, furnish all the air needed for this rush job. The men have only to step off track with the tampers to keep traffic moving.

The Crawl-Air compressor, a self-propelled unit, is an ideal machine for supplying air to a fast working section gang equipped with modern air-operated track tools. It can easily keep up with the progress of the work as it moves along side the track. It can travel through a cut, and when a fill is encountered can usually be run along the base of the fill if the shoulder of the subgrade is not wide enough for its passage. Or, as in the case of a bridge or trestle, the Crawl-Air can travel between or astraddle the rails.

- Built in 3 sizes: 8, 12 or 16 tool units.
- It is only 42" wide over-all.
- Climbs a 40% grade—
- Will not tip over at a 45° angle.
- Powered with either gasoline or oil engines.
- Can turn in its own length.

Traffic interference at points of work can be avoided and slow orders kept to a minimum with an I-R Crawl-Air compressor and track equipment.

ORIGINATOR OF MECHANICAL TAMPING

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

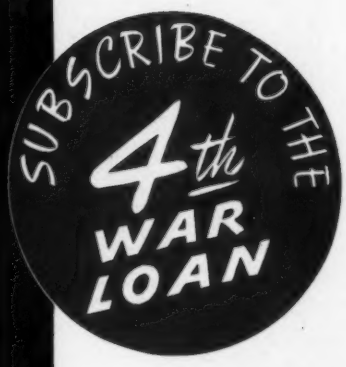
11-414

CENTRIFUGAL PUMPS • CONDENSERS • COMPRESSORS • TURBO BLOWERS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES

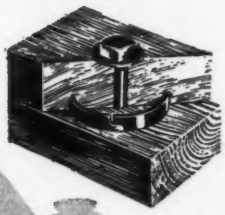
HEADFREE JOINTS

THIS shows a six bolt 36" Headfree Standard Joint in the Illinois Central Railroad test track installation between Monee and Kankakee, Illinois. This test is in high speed, heavy traffic, main line track; this is fully described in this issue. Included in this installation are Continuous Armored Insulated Joints and "RAJO" Compromise Joints.

Watch the joint bar performance in this accelerated test.



Making all TIMBER connections



The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.

Types of Railway structures using TECO TIMBER CONNECTORS:

1. Roof Trusses
2. Overhead Cranes
3. Timber Bents
4. Connections between pile heads and caps.
5. Trestles.
6. Ballast deck stub piles.
7. Piers.
8. Pier Fenders
9. Sway Bracing
10. Coal Pockets
11. Auto Loading Dock
12. Between Rail Post and Tie Connections
13. Bridge Decks
14. Scaffolding
15. Cooling Towers
16. Warehouses

This structure employs TECO spike grids in all braced joints . . . The TECO system of construction is ideally suited to shop fabrication. All bents for this trestle were pre-framed and pre-treated.

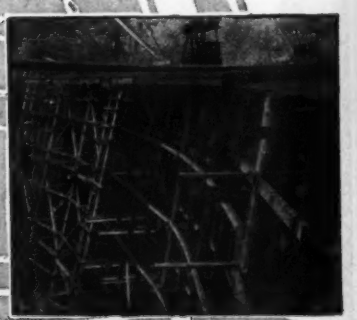
Detroit Terminal loading dock, 600' x 50'. Thirty-five 50' trusses fabricated and assembled at job site and erected in units.

Because of advantages in strength, economy, and long life, the railways of America use timber and TECO Connectors for practically every type of railway structure.

These advantages . . . of more joint strength with less wood and hardware . . . are obvious to those familiar with the TECO System of Timber Construction, which has been largely responsible for the many advances recently made in engineering timber to modern use as a construction material.

Full details, with case histories of jobs done, will be sent you on request.

Chesapeake & Ohio Roundhouse, Clifton Forge, Virginia. Split rings were used for timber roof truss joint connections. Toothed rings were used for attachment of timber roof truss seats to timber columns.



Southern Pacific Trestle, Cochran, Ore. TECO toothed rings (3½") used in bracing connections on this structure.

TIMBER ENGINEERING COMPANY

NATIONAL MANUFACTURERS OF ***TECO*** *TIMBER CONNECTORS AND TOOLS*

WASHINGTON CHICAGO MINNEAPOLIS NEW ORLEANS PORTLAND

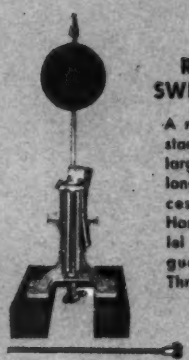
THE RACOR GUIDE

TO BETTER RAILROAD OPERATION

With record-breaking freight and passenger loads the order of the day, Racor-engineered equipment is a proved means to safe and continuous operation. For Racor track and switch equipment incorporates the latest features of safety and ruggedness.

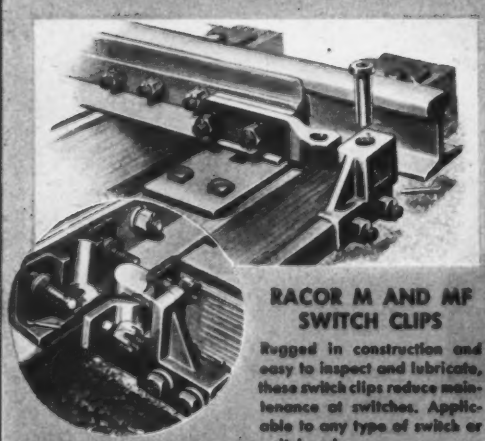
RACOR SWITCH POINT LOCK

Switch point locks protect trains against failure of switch stands from any cause. An independent, damage-proof mechanism keeps the point locked in position.



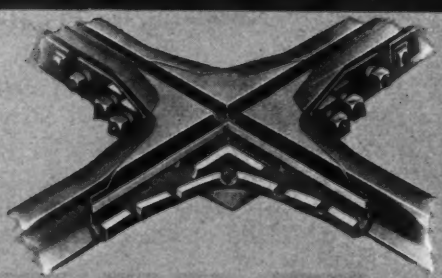
RACOR COLUMN SWITCH STAND—112D

A rugged main line switch stand. Simple design and large bearings guarantee long life. All parts are accessible for inspection. Hand lever is thrown parallel to the track, thus safeguarding the operator. Throw is adjustable.



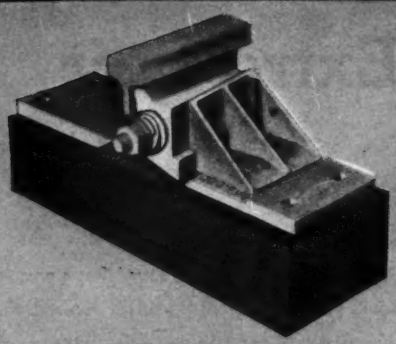
RACOR M AND MF SWITCH CLIPS

Rugged in construction and easy to inspect and lubricate, these switch clips reduce maintenance at switches. Applicable to any type of switch or switch rod.



RACOR DEPTH-HARDENED REVERSIBLE MANGANESE CROSSING

Hardness at intersections is increased by depth-hardening to that of work-worn manganese steel. Bearing walls are directly under impact points. A heavy bottom plate ties side walls together. Uniform sections provide the best possible conditions for repairs by welding.

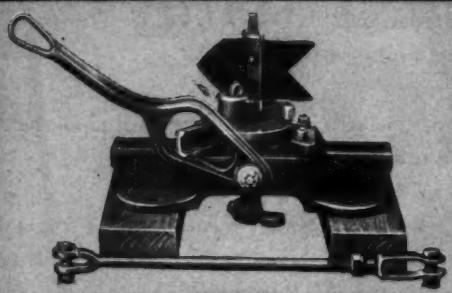


RACOR ADJUSTABLE RAIL BRACE

A well-designed adjustable rail brace for switches. Easily and quickly adjusted. Provides solid backing for interlocked switches. Will not tilt stock rail in tightening.

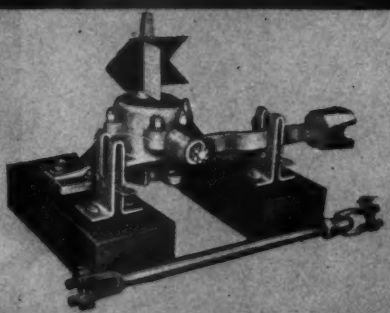
RACOR RAIL LUBRICATOR

Simple to install. Automatic in operation. Rail lubricators reduce wheel friction on curves, permitting train loads or speeds to be increased. One lubricator will grease several curves even though they may be miles from the distribution point.



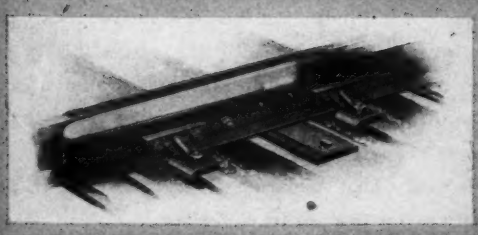
RACOR AUTOMATIC SAFETY STAND—20B

A low target stand especially designed for multiple track locations. Absolutely rigid for hand operation, yet always set for automatic action in the event of a train trailing into a closed switch. Target always indicates true position of the switch points—whether thrown automatically or manually.



RACOR PARALLEL-THROW GEARLESS SWITCH STAND—36D

A switch stand for unrestricted use. Extra heavy housing, large bearing surfaces and an oversize crank eye make it impossible to overstress working parts in normal operation. Throw of points can be adjusted without respiking the stand.



RACOR MANGANESE SWITCH POINTS

These switch points have unmatched service life and reduce trackwork upkeep costs. The durable manganese steel switch point withstands continued abrasion by wheel flanges. The point end has approximately the same life as the rail in the heel end.

Further information on the whole line of Racor products is available on request.

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Brake Shoe

Give Bill

an Extra
Pair of Legs

"An Extra Pair of Legs"

"Boss, business certainly looks good for us this year," ejaculated the star railway salesman to his sales manager.

"That's the way I've figured it out, Bill," replied the sales manager, "but I'm glad to hear you say it for you're in closer touch with these railway maintenance officers than I am."

"Everywhere I go, I hear of big programs. These railway men have so much work ahead of them that they're nearly frantic."

"They're going to need a lot of our materials, then."

"No question about it. They're all asking about deliveries."

"That's where we're sitting pretty. Our plant's doing a great job in production."

"That's what worries me."

"Worries you? Why?"

"My inability to tell the story of our material to all the people who ought to have it."

"That's your *job,* Bill.

"I know it is but I can't get *everywhere.* Don't forget that there used to be three of us calling on these railroads until you laid Jim off during the depression."

"That's true—and Harry was called into the Army last spring."

"And I'm now expected to cover all three territories."

"What else can we do? We can't get any new men now."

"I realize that—but you can give me a *big lift.*"

"How's that?"

"By increasing our advertising in *Railway Engineering and Maintenance.*"

"Why do you suggest that?"

"Because I know it'll help me a lot. It'll double my results. It'll shorten my calls and save call-backs, and it'll keep our materials before a lot of people I just can't get around to see."

"You mean that more advertising will enlarge your contacts and enable you to cover more ground?"

"I know it will. That magazine's read by everyone I call on and they'll see our story in its pages."

"You're right. It *can* help you cover more territory. We'll make it serve as an extra pair of legs for you."

RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS

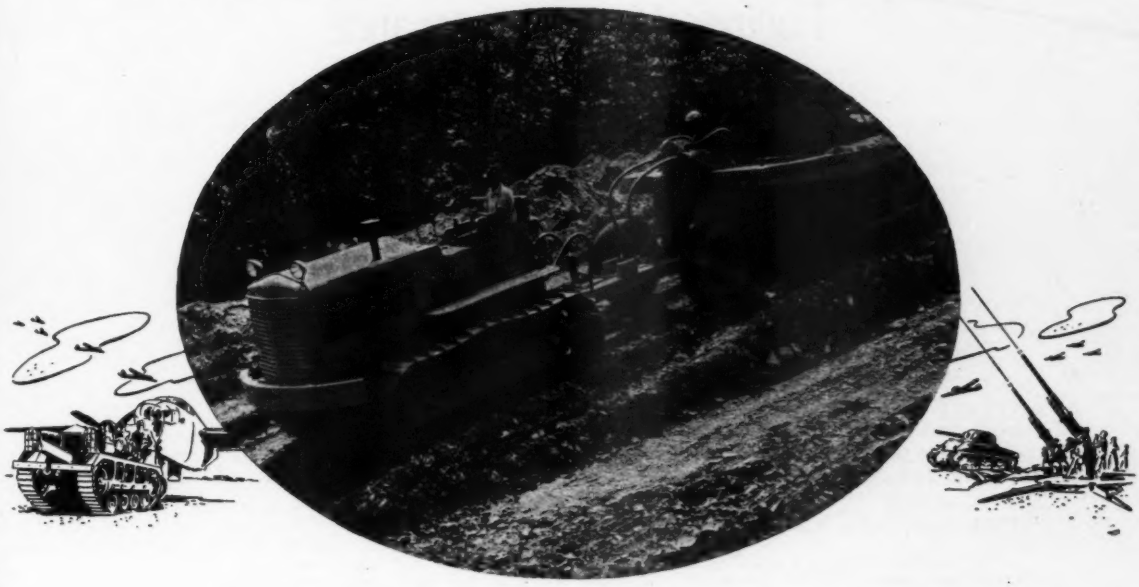
Homelite Portable Generators are affectionately known in the Armed Forces as "putt-putts". Men who see and *use* them . . . around airports, or in bombers and tanks . . . have come to know them for their dependable performance under the toughest possible conditions. Those men can see right now how ready and able these new, handy "putt-putts" will be after the war . . . for operating floodlights, electric tools, radios, signal systems and many other devices.

There's no doubt about it, ex-service men will be among the best supporters of Homelite Portable Generators . . . for right now, these "putt-putts" are supporting them, wherever they are, in every possible way.

HOMELITE CORPORATION

PORT CHESTER, NEW YORK

The experiences of war have proven the value of **Cletrac Tru-Traction**



EVERY high-speed crawler vehicle used by the armed forces has employed controlled, differential steering. This means the ability to steer with the tractor under control at all times because of power on both tracks at all times. Controlled differential steering is an operating feature *exclusive* with Cletrac. We call it *Tru-Traction.*

It is used on practically all military crawler type equipment.

With Tru-Traction, you have power that is dependable in getting through tough spots without stalling or miring down. Power that can be used when turning at high speeds without jack knifing. Power that will do your jobs better—and put more money in your pocket.

Only Cletrac has Tru-Traction.

THE CLEVELAND TRACTOR COMPANY • Cleveland, Ohio

Cletrac Crawler Tractors

GASOLINE AND DIESEL

No. 182 of a Series

Railway
Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: We Like the Idea.

February 1, 1944

Dear Reader:

"Why don't you suggest to the managements of the railways that they enter subscriptions to Railway Engineering and Maintenance for their maintenance foremen? Every magazine that I read and every radio address that I hear emphasizes the manpower shortage and the high labor turnover and stresses the importance of the foreman as the key man in this situation. He represents the company in his contacts with his men; yet he is not being given the help that is due him.

"A good foreman will usually hold a good gang, for under such direction the turnover is small. I used to make my foremen a present of this magazine and know how much benefit they got from it. A single idea gained from its pages frequently repaid many times the cost of all the subscriptions. I've seen my foremen take their copies out on the job in order to discuss some controversial question with their men.

"I went for years without a reportable accident among my men, for my foremen were alert to their responsibilities. The credit was theirs, not mine. They were trained to think. And no small part of this training came from the wider horizon opened to them through reading your magazine. The small expenditure required to place this paper in the hands of all its maintenance foremen will bring large returns to any road."

The above quotation from a letter received during the month from a widely-known veteran track supervisor is so directly to the point as to require little elaboration, other than to say that some roads* now follow this suggestion and their foremen receive Railway Engineering and Maintenance regularly through the action of their managements. At a time when foremen are pressed to the point of discouragement by the difficulties confronting them, I can think of no step which other managements could take that would be more heartening than to give their maintenance foremen this aid, which would come to them each month as a fresh reminder of their company's interest in the efficiency of their work. Do you agree?

Yours sincerely,

Elmer T. Howson

Editor

ETH:kw

*I will be glad to give you their names on application.

Railroads don't really *earn* a profit . . . they *SAVE* a profit!

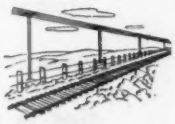
How? By rigid economies in operating and maintaining their properties. Consider a typical pressure-creosoted cross tie. On the average, this treated tie costs approximately 25c less than an untreated tie for each year of service. That amount is equivalent to the average railroad net operating income from the haulage of 125 ton-miles of freight. The creosoted ties in a mile of track saves each year an amount approximating the net operating income from haulage of 300,000 ton-miles of freight. The total saving thus realized or possible from the use of creosoted ties amounts to approximately Two Hundred Million ($200,000,000.00) Dollars annually.

Many roads have made further substantial savings by application of treated wood to other uses. Thorough investigation of *why* wood is repaired or replaced in any application will almost always develop the fact that economies can be effected through the use of pressure-treated material.

CARS One road reports that pressure-treated decks and nailing strips have outlasted as many as four applications of untreated parts. Another reports sixteen years' life to date from pressure-creosoted decking, with many more years of service expected. It is surprising how "mechanical" damage or breakage is reduced when car lumber is protected against "weakening" by decay.

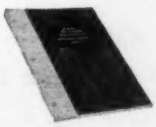
PLATFORMS Pressure treatment increases resistance to mechanical wear as well as decay in station and other platforms. In one warehouse four-year old untreated flooring was so badly worn that it was necessary to make repairs. The floor was covered with pressure-treated lumber, which is still good after twelve years' service. Treated lumber for all platforms will afford a means to further "Save a Profit."

CROSSINGS Maintenance of crossings causes a lot of trouble and expense that can be reduced by installing pressure-creosoted wood. Special types are available that are assembled in sections for easy-handling and installation with low-cost-per-year service.



POLES AND POSTS Railroads maintain 100,000 miles of pole lines including approximately 3,500,000 poles. Engineering records show that pressure-creosoting extends life from 10 to 25 years. Equally impressive records are being made by pressure-treated posts.

SPECIAL For hazardous locations you can now get wood impregnated for fire retardance as well as resistance to decay.



Send for this book

An interesting illustrated 28-page book, "Economical and Permanent Construction with Pressure-Treated Wood," has recently been printed. It gives a lot of helpful information on methods of treatment, applications, and results. We will be glad to send you a copy.

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Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

FEBRUARY, 1944

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Railway Engineering and Maintenance

Public Recognition

Of Indispensability of Railway Service

One of the most heartening developments of this period of stress for the railways has been the growing recognition by the public of the indispensability of their services. Indicative of such recognition is a report made to the United States Senate in the closing days of 1943 by a special committee investigating the National Defense Program and headed by Senator Truman.

In the opening sentences of its report, the Committee stated that "the importance of transportation as a war activity has not been adequately recognized. The movement of the things we produce to the point where we use them, while possibly less spectacular, is no less vital than either the function of production or consumption.

"At the beginning of the war, the United States had the finest transportation system in the world. These transportation facilities have contributed to the development of a standard of living and comfort not elsewhere equally enjoyed. At the same time, they have become so woven into our national life that we are dependent upon them, not only for our comforts, but our productive effort. A breakdown, or even a diminution in transportation service, would have incalculable repercussions on our war effort."

Appreciation of Maintenance Needs

Equally encouraging is the growing appreciation of the conditions that are now confronting the railways and their maintenance officers in their efforts to make good the record wear and tear and of the necessity for giving greater attention to their needs if the railways are to continue their unparalleled record. Thus, in the report referred to, this committee states that "good as our transportation system is, it is folly to assume that there is no limit to the strain it can withstand."

Referring specifically to roadway and structures, the report continues, "Due to shortages of materials and manpower, the 1943 war-curtailed program for maintenance of way, including rail replacements, is expected to fall short by $200,000,000. During the depression, the railroads reduced their rail replacements to only half the amounts previously utilized, and shortages of steel up to the present time have prevented adequate replacement. One indication of the weakening of rails is the development of an excessive number of transverse fissures. Derailments caused by failures of rails and rail joints have also increased."

A Challenge to Railway Men

Coming from a source of such influence, appreciation of the basic importance of the railways and concern for their adequate maintenance is most encouraging. It gives promise of better days for the railways, both in the difficult period that is immediately ahead and in the post-war era that will follow. Such a development should increase the determination of maintenance of way forces to do their utmost with such labor and materials as they have, in order that they may maintain the remarkable record of the railways to date. The year 1944 will be a year of test for railway maintenance forces, and a year of outstanding opportunity.

Rail Laying—

A Still Larger Task in 1944

In planning their work for the coming season, maintenance officers are showing more than ordinary concern about their rail laying programs. There are plenty of reasons why this is so, but the most outstanding is the unfavorable outlook for labor.

The latest indication of this concern was evidenced in the unusual interest that was shown by these officers in the program of the last meeting of the Maintenance of Way Club of Chicago, on January 24, at which the New York Central's motion picture on modern rail laying methods was presented. Breaking all previous attendance records, more than 250 men, from points as distant from Chicago as Denver, Omaha, and Cleveland, were present.

Confronted by a critical labor situation in 1944, while tentatively assured more rail than they received in 1943, these men are grasping at every straw to meet the problem of laying this rail, and of caring for it properly to prevent its being damaged by traffic. Chief among their interests in this regard is how to lay the maximum amount of rail, and to follow it up adequately with surfacing, with the least number of man-hours—that is, effecting the maximum utilization of the manpower that will be available.

The fact that this phase of the problem should concern them is evidenced in the rail situation of the last year and the prospects for 1944. In 1943, the railways received 1,513,000 net tons of new rail for replacements. On December 1, they still had nearly 1100 miles of this rail on the ground waiting to be laid in track. In December, they received an additional 119,000 tons, or about 550 track miles of rail, much of it too late in the month to be laid before the close of the year. However, assuming that they laid 600 miles in December, which is as much as they laid in any earlier month of the year, it is evident that at the close of the year they still had on hand on the ground approximately 1,000 miles of rail, waiting to be laid.

No one factor was responsible for this situation in a year in which the railroads were anxious to secure considerably more rail than they were allotted, and made every effort to lay their rail as fast as it was received. But the principal reason, above all others on most roads, was the shortage of labor.

For 1944 renewals, the railways asked for 2,500,000 net tons of rail. The official request of the Office of Defense Transportation on the War Production Board was for 2,200,000 tons, and in the first quarter the railways have been allotted 535,000 tons, with good prospects that they will get the full amount recommended by the ODT. In other words, the prospects are that the railways will get approximately 580,000 more tons of rail in 1944 than they received in 1943.

The fact that they were unable to lay a considerable tonnage of the rail that they received in 1943, raises a very pertinent question as to how they can lay a half million tons more rail this year than in 1943 under labor conditions that promise to be no less stringent than in 1943, not to mention surfacing it properly after laying, with the heavy labor demand which this latter work entails.

Space will not permit discussion here of all of the probable answers to this question, even if all of these answers were known. But several things stand out clearly—that the concern of engineering and maintenance officers over the rail laying problem ahead is not unfounded, and that there can be hope of meeting the large task that lies ahead only through a combination of every means of increasing the labor available to the railroads, and of greater effort to secure the maximum output from every man-hour through more skillful programming, increased supervision, more efficient gang organizations and more intensive use of work equipment.

Winter—

A Reprieve, But Threat Still Hangs Heavy

So far in the present winter, the maintenance of way forces in most parts of the country have had a real "break" with the weather. While a few sections have experienced severe cold spells and considerable snow, most parts of the North where the heaviest snows are normally to be expected, have had less than their usual amount to date, and the Middle West, in its broadest terms, is experiencing one of the most severe drouths on record. So, while farmers are bemoaning a situation that may well be serious for them, and, at the same time, to the country at large because of its effect on the winter grain crop, railway maintenance men smile and carry on more productive work than has been possible at this season of the year for many years in the past.

But the winter is not over, and Providence alone knows what is still in store. That fact must be kept constantly in mind. There must be no let-up in preparedness, and every available man must be kept fully alert to the difficulties that it may still have in store. Three months ago, many maintenance officers were deeply concerned as they viewed the months ahead. Confronted with serious shortages in manpower, especially in terminal areas where storm tie-ups can cause the greatest havoc, and at the same time faced with the necessity for moving the greatest traffic load in history, there was feverish preparation to meet what the winter might bring. Snow fighting organizations were perfected; switch heaters, snow shovels and brooms, snow plows, clamshells, power shovels, Jordan spreaders, weed burners, tractor bulldozers and rotary snow brooms were put in readiness; and there was even talk of calling on high-school boys and women, and of asking aid from the military forces to swell the ranks of snow handlers in the case of serious emergency. All this had to be done. In the face of the dire consequences to war transportation inherent in a severe snow blockade, anything less would have been a gamble with disaster. It was preparedness at its best.

But the threat of all that concerned maintenance men in November still hangs over their heads. The worst of the winter in many areas is still ahead. Some normally experience their heaviest snows in February and March. The labor situation has not improved. Few, if any, roads have been able to add to their snow-fighting equipment. Anything can still happen. Maintenance men have had a welcome reprieve, but the "noose" still swings for the man who is caught off his guard

—a noose that could hang not only any individual, but his railroad and the war effort.

Will any maintenance officer, from chief to foreman, risk that possibility? If he will not, he will do well to recheck his snow-fighting set-up, both equipment and personnel, without delay, to be certain that it is still complete and ready to go into action on a moment's notice. It was fine that his set-up was complete and ready on November 1, on December 1 and again on January 1; this is as it should be, but is not enough. It must be just as complete and ready to go into action on February 1 and on each succeeding day until the last threat of winter has passed.

The Labor Problem—

Now Approaching a Crisis

DURING the last year the gravity of the materials problem has gradually been overshadowed by that of labor, for in the middle of 1943, manpower became the No. 1 problem for the nation as a whole and, particularly, for the railroads. While much has been said and written on the subject, most of the effort of government agencies has been directed primarily toward solving this problem in war industries. With war production nearing a peak and with the government now cancelling some war contracts, the manpower problem, so far as many war industries are concerned, appears now to be reasonably certain of solution and, in fact, promises to ease considerably during 1944. Exactly the opposite condition prevails on the railroads, however, and the situation here is rapidly approaching a crisis.

This was brought out emphatically on January 6 by Interstate Commerce Commissioner J. Monroe Johnson, when he recommended to a special subcommittee of the United States Senate that the 200,000 railroad men now in military service be returned to the railways, on the grounds that "one good railroad man on a railroad is worth a thousand railroad men in the army."

Commissioner Johnson, Joseph B. Eastman, director of the Office of Defense Transportation, and others are endeavoring to bring the seriousness of the railroad manpower situation home to the authorities in Washington. To the extent that they succeed, further drain on railroad manpower may be stopped. In the meantime, every railroad officer must continue to comb the "highways and byways" in his area for help.

Among all the departments of the railroads, the situation is most serious in the maintenance of way and structures department and especially in the ranks of unskilled laborers in these departments. Many methods have been tried by maintenance officers to fill their forces and these have been studied by a subcommittee of the American Railway Engineering Association. An abstract of the report of this subcommittee, which will be presented before the association in March, appears elsewhere in this issue. In addition, another article presents in considerable detail the specific labor problems of four maintenance officers during the past year. While many of the expedients described have been tried more or less widely, a study of these articles may reveal some methods or sources of labor which have not yet been exploited on some roads, and which may prove of value to them in surmounting the impending labor crisis. No stone must be left unturned in an unceasing effort to secure an adequate force and thereby insure that the transportation of war materials will continue uninterrupted for the duration of the war.

Alert Thinking—

New Problems Require New Solutions

ONE of the outstanding characteristics of the old-time roadmasters and supervisors was the tenacity with which they clung to established practices. However, this attitude was not confined entirely to these men, for even chief engineers have been known to exhibit traces of the same psychology. This attitude was an important factor in retarding the acceptance of power machines and tools; to some extent it prolonged practices in laying rail that were detrimental to its service life; and other outmoded methods persisted because men did not want to discard habits of thought or acquire new ones. However, the world moves on inexorably, and one who is unable to conform to the changes that are taking place is eventually outclassed by those who are willing to do so.

Normally, major changes occur through a process of evolution, allowing opportunity for adaptation to them over a considerable period of time. Today, the conditions surrounding mantenance are changing with breath-taking rapidity. From the situation which prevailed so long in which labor and materials were plentiful but the funds necessary to use them were restricted, a new situation has arisen suddenly in which more money is available than maintenance officers had ever hoped for, although they can take only partial advantage of it because there they face a greater scarcity of labor than they have ever known, while many of the materials they need are unobtainable or can be obtained only in insufficient quantities and some after long delay. These conditions prevail at a time when the fixed property is being subjected to the highest rate of wear in all history.

While this is the overall situation, internal changes that are kaleidoscopic in character are taking place constantly. Nothing remains fixed, for a condition that was apparently cleared up yesterday may require new attention today, and the pattern may be one that has not appeared previously. The present situation, therefore calls for the maximum of initiative and for a high order of constructive thinking. It also calls for mental flexibility and alertness and ability to adapt oneself immediately to a new situation.

While one cannot discard precedent entirely or violate basic principles with impunity, this is no time to depend on precedent to solve all of the problems that are now pressing for solution, or to cling to practices that are not adapted for present requirements. It must be recognized that new problems, although some of those now presenting themselves are merely old problems in new forms, require new solutions, and all of those officers who are able to provide the quickest and simplest solution will, in the long run, be the ones who will get the best returns from their efforts and alert thinking.

Twenty Miles of

By G. M. O'Rourke

Assistant Engineer, M. of W.,
Illinois Central System
Chicago

This paper describes extensive tests installed by this road in a section of main line near Chicago, during the last summer, to develop most satisfactory standards of construction. The tests cover ties, tie plates, tie plate fastenings, rail anchors, joint bolt tension, joint expansion gaps, joint lubrication, types of ballast, and several other features of track construction, including a half-mile section of asphalt-coated stone ballast

G. M. O'Rourke

WHEN the Illinois Central laid 131-lb. rail on a 20-mile stretch of two-direction, heavy-traffic main line near Chicago during the last summer, its initial installation of rail of this section, it took the opportunity afforded to use this piece of track as a test section to obtain as much information as possible concerning the best practices in track design to be followed in future installations of 131-lb. rail. Accordingly, tests were installed in this track covering ties, tie plates, tie plate fastenings, rail anchors, joint bolt tension, joint expansion gaps, joint lubrication, types of ballast, and of several other features of track construction, including a section of asphalted ballast. A significant feature of these tests is that the entire series was so designed that the results of no one of the individual tests will influence the results of any other.

Ideal Section for Tests

This 20-mile test section is located between Monee and Kankakee, Ill., in three-track territory, on the middle track—Number 2—which carries traffic in both directions. Number 1 track carries southward trains only, and Number 3 track northward trains only. The test main, Number 2, carries in excess of 20 million gross tons per mile per annum, which is more than enough to justify the use of 131-lb. rail.

Monee, Ill., at the north end of the test section, is 34 miles south of Chicago, and is on the divide between the Great Lakes and the Mississippi valley. Kankakee, Ill., at the south end of the test section, is 56 miles south of Chicago, and is about 150 ft. lower than Monee. Between these two towns there is only one curve, a 45-min. curve which is 1800 ft. long, and the maximum gradient in both directions is about 0.4 per cent. There are three small towns in the territory —Peotone, Manteno and Bradley— and one overhead railroad crossing.

Considering its proximity to Chicago for observation, and its traffic, grade and alinement conditions, with a rather wide range of temperature, this 20 miles of new 131-lb. rail is in about the most desirable location on the entire railroad for making track tests. After considering a large number of suggestions as to the specific tests to be made, decision was reached to establish those described in this paper. At the outset, we were fully aware that rather extensive tests of the character planned had been made on other roads, and that some are still under observation, but we are hopeful that something constructive may come out of our tests that will add to the knowledge gained from others.

Just prior to the installation of our tests and the laying of the 131-lb. rail in the test territory, a Speno ballast cleaning machine was operated over the three tracks to clean the ballast shoulders, including all ballast in the inter-track spaces. In this work, wherever an unusual amount of moisture was observed, the location was marked for the installation of cross drains to draw water out of the inter-track space, and where an unusual volume of muddy ballast was encountered, further investigation was carried out, which resulted in several installations of sub-drainage.

Various Joint Tests

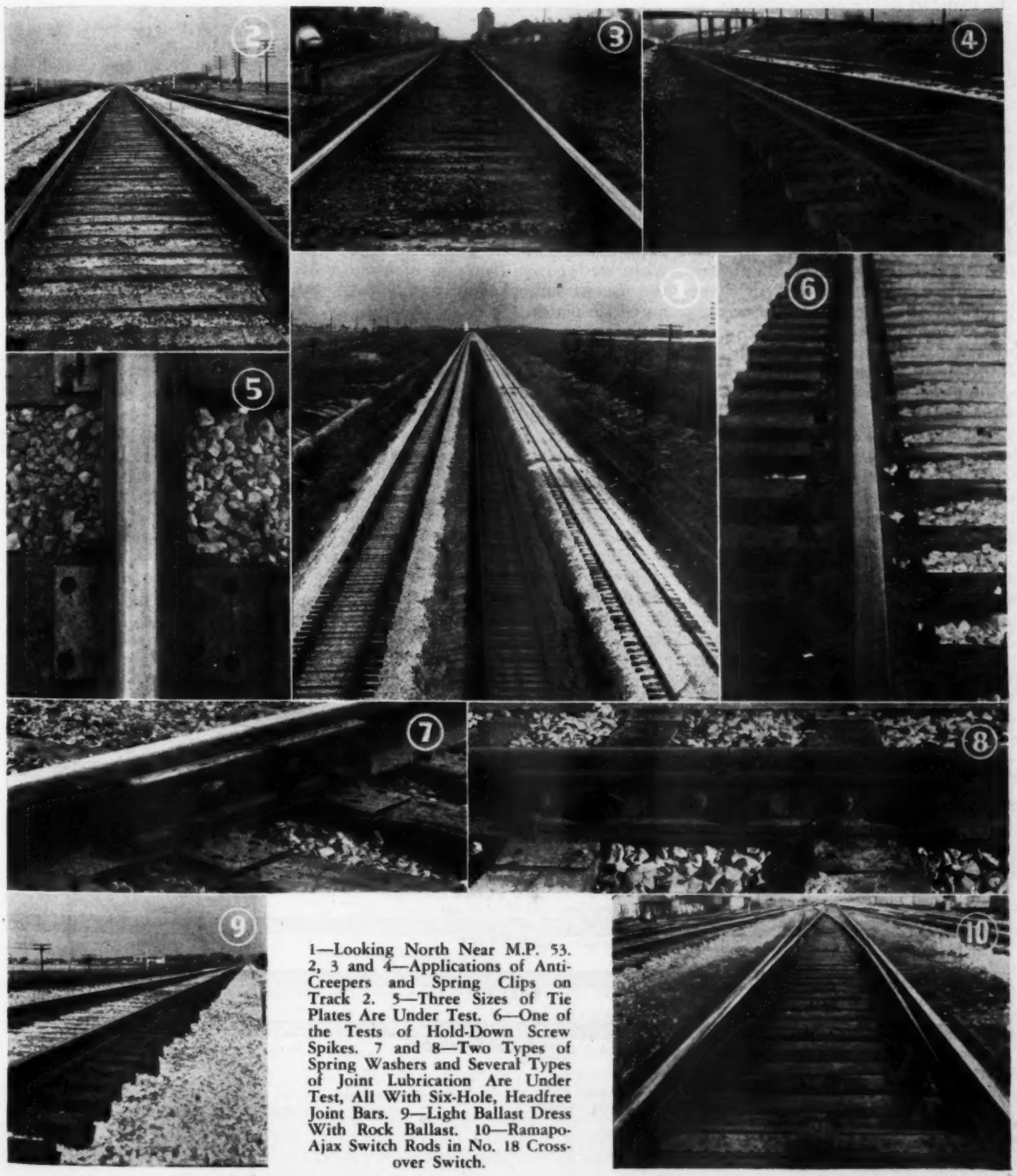
The first 131-lb. rail was laid at M.P. 35, at Monee, on June 22, and progressed southward. All the rail was control-cooled and end-hardened. An attempt was made to lay 10 miles with standard A.R.E.A. expansion, 5 miles with one-half of standard and 5 miles with one-quarter of standard expansion, but because of high temperatures which prevailed during the laying, the results are not as satisfactory as they would have been if the rail had been laid earlier or later.

Joints in road and street crossings and along station platforms between insulated joints were butt-welded. These stretches of continuous butt-welded rail are from two to ten rail lengths long. Elsewhere throughout the test area, six-hole, 36-in., head-free joint bars with 2½-in. by 6½-in. by 6½-in. punching were used, with 1-1/16-in. by 6-in. bolts. Tension tests were conducted on the bolts on July 28, 29 and 30. Fifty joints on the west rail were placed under test beginning at M.P. 45, at the middle of the 20-mile section, and continuing

*A paper presented before the Maintenance of Way Club of Chicago on November 22, 1943.

Tests on Illinois Central

Hold Answers to Many Track Problems*



1—Looking North Near M.P. 53. 2, 3 and 4—Applications of Anti-Creepers and Spring Clips on Track 2. 5—Three Sizes of Tie Plates Are Under Test. 6—One of the Tests of Hold-Down Screw Spikes. 7 and 8—Two Types of Spring Washers and Several Types of Joint Lubrication Are Under Test, All With Six-Hole, Headfree Joint Bars. 9—Light Ballast Dress With Rock Ballast. 10—Ramapo-Ajax Switch Rods in No. 18 Cross-over Switch.

southward. The mill scale was thoroughly cleaned from both the joint bars and the rail ends of the first 25 joints, employing an acetylene torch and a steel wire brush. The bolts for this test are the regular standard track bolts used elsewhere throughout the test track, except that they were specially prepared in the maintenance of way department equipment shop of the Illinois Central with strain gage holes in each end for taking the bolt tension readings.

The next 25 joints to the south were applied in the usual way, using the material in the same condition as received from the manufacturer. The initial bolt tension measurements and records were made by representatives of the research department of the Association of American Railroads. No bolts were tightened subsequently until early in November when additional measurements and records were made by the A.A.R. staff. The purpose of these tests is to determine whether the removal of mill scale from the rail ends and joint bar fishing surfaces will reduce the initial rate of bolt tension loss or have beneficial effects on joint bar wear.

The insulated joints used in the tests are the armored type of The Rail Joint Company. Spring washers, or nutlocks, are used on all joint bolts from M.P. 35 to M.P. 50, and Triflex springs are used on all bolts in the south five miles of the test section.

R.M.C. plastic joint lubricant was placed between all joint bars and the rail on Miles 36 to 41, inclusive, and from M.P. 42 to M.P. 50.5 The joints on the north half of Mile 42 are lubricated with Crator compound, and those on the south half with graphite grease. From M.P. 50.5 to M. P. 55, the rail ends were oiled in the usual manner before the joint bars were hung, using Texas 45 joint oil.

Present and probable future traffic conditions on those parts of our railroad where we plan in the future to lay new 131-lb. rail and to use new tie plates emphasize the importance of proper design of the tie plates. Indications are that if tie plates are designed properly, with sufficient bearing area and strength, and are held firmly to the ties, penetration in the ties will not only be reduced materially, but uneven settlement of the plates inside and outside of the rail will be eliminated.

We know that our 7¾-in. by 11-in. tie plates for 112-lb. rail, which have 13/32-in. eccentricity, settle into the ties under heavy traffic, especially where softwood ties are used, resulting in excessive mechanical wear of the ties and tight gage. The tendency to tight gage has been met on our railroad in the past by using track gages ⅛ in. longer than standard when laying new rail, but this practice was discontinued in March, 1941, when we began our investigation into the use of larger, more evenly balanced tie plates.

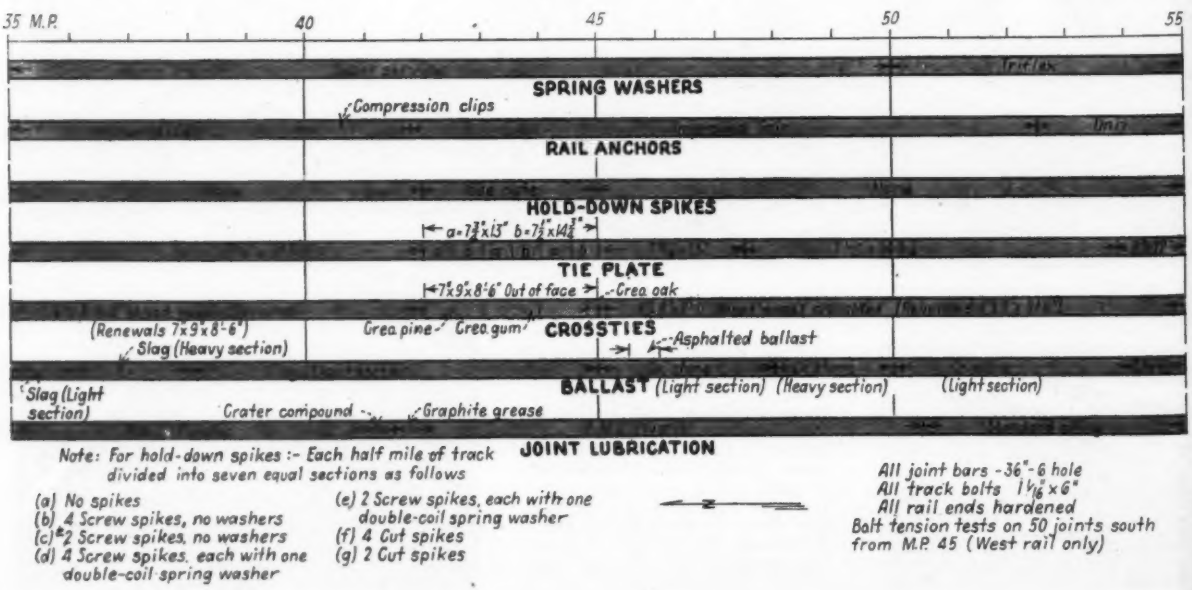
This problem of tight gage has not been peculiar to the Illinois Central. In 1940, the Santa Fe, the Southern and other railroads were having trouble with the tightening of gage under traffic. In 1941, the Union Pacific laid some 450 track miles of new 112-lb. rail to a gage ⅛ in. wider than standard so that following settlement of the tie plates the gage would be approximately 4 ft. 8½ in.

Recent inspection on the Illinois Central of 7¾-in. by 11-in. double-shoulder tie plates laid new with 112-lb. rail in 1937 and 1938, on tangent track carrying approximately 20 million gross tons of traffic per year, showed that the tie plates were sinking into the ties with a decided cant to the inside, indicating that the pressure of the plates on the ties was not uniform. Plate cutting under heavy traffic, especially where softwood ties are used, is a major problem. Therefore, of all the tests that we are conducting on our test track or could conduct, we consider this test of the proper design of tie plate of the greatest importance.

In our tie plate test, 7½-in. by 14¾-in. tie plates were laid out-of-face on Miles 36 to 42, inclusive; 7¾-in. by 13-in. plates were laid on each alternate half mile from M.P. 42 to M.P. 44.5, and 7½-in. by 14¾-in. plates were laid on the other alternate half of each mile from M.P. 42 to M.P. 45. From M.P. 45 to M.P. 47.5, the 7¾-in. by 13-in. plates were again used out-of-face, changing back to the 7½-in. by 14¾-in. plates out-of-face for the ties from M.P. 47.5 to M.P. 53.8. From M.P. 53.8 to the south end of the test track at M.P. 55, a wider but shorter plate, 8-in. by 12-in., was installed.

The 7½-in. by 14¾-in. tie plates, which has ½ in. eccentricity, weighs 22.14 lb.; the 7¾-in. by 13-in. plate with 9/32 in. eccentricity, weighs 19.12 lb., and the 8-in. by 12-in. plate, with 17/32 in. eccentricity, weighs 16.41 lb. All plates have flat-bottoms and a cant of 1 in 40, and all but the 8-in. by 12-in. plates have a greater percentage of their length on the inside, or gage end, than our present standard 7¾-in. by 11-in. tie plate for 112-lb. rail. We anticipate that these plate penetration tests will

Diagrammatic Plan of the Various Tests on No. 2 Track.



bring up-to-date and add information to other tie plate tests of some 14 or 15 years ago.

The desirability of having tie plates fastened securely to the ties has been mentioned. We propose to investigate various systems of fastening the tie plates to treated pine, treated gum and treated oak ties. The purpose of our test in this regard is to demonstrate the benefits to be gained by anchoring the tie plates firmly to the ties, and to compare the results obtained by different methods of fastening. Tests are to be made with four screw hold-down spikes, two screw hold-down spikes, four cut hold-down spikes, and two cut hold-down spikes per tie plate, and without any hold-down spikes per plate. The rails in each case are fastened to the ties independent of the plates with 5/8-in. by 5/8-in. by 6-in. cut track spikes according to Illinois Central standard spiking, the outside spikes to the north in the direction of heavy traffic.

The screw hold-down spikes to be employed will be 7/8 in. by 6 in. We plan to install a double-coil spring washer between the tie plate and the head of each of half of the screw spikes, to hold the plates securely and to avoid frequent tightening of the spikes. No hold-down spike will be used between M.P. 35 and M.P. 42, or between M.P. 45 and M.P. 55. On the three miles between M.P. 42 and M.P. 45, each half mile will be divided into about seven divisions. For all practical purposes, ten 39-ft. rails will be used for each method of fastening of the plates to the ties, as follows:

First 10 rails—No hold-down spikes.

Second 10 rails—4 screw spikes—no spring washers.

Third 10 rails—2 screw spikes—no spring washers.

Fourth 10 rails—4 screw spikes—each with one double-coil spring washer.

Fifth 10 rails—2 screw spikes—each with one double-coil spring washer.

Sixth 10 rails—4 cut spikes.

Seventh 10 rails—2 cut spikes.

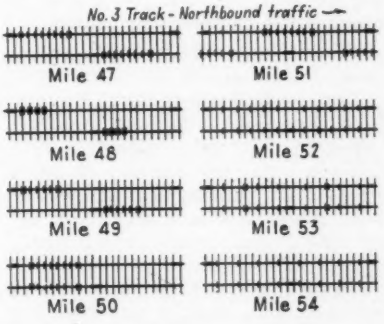
This cycle will be continued throughout the three miles.

Rail Anchor Tests

In our rail anchor tests, 14 anchors were applied per rail, 8 against northward movement and 6 against southward movement. Following this arrangement, Improved Fair rail anchors were applied on Miles 35 to 40, inclusive, and from M.P. 41.8 to M.P. 52.5, and Unit anchors were applied between M.P. 52.5 and M.P. 55. Supplementing these comparative installations, twelve rail clips were installed per rail length between M.P. 40 and M.P. 41.8.

Tests of different ways of grouping or distributing rail anchors on each rail length and in the use of different numbers of anchors per rail length were considered, along with other tests, but before details were worked out the new 131-lb. rail was laid and anchored as already described, and it would have required considerable time and labor to rearrange the anchors. However, when it was decided to lay 11 miles of new 112-lb. rail on the adjacent Number 3 track, we agreed to make such tests on that track as desired by Subcommittee 10 of the Track committee of the American Railway Engineering Association, in an attempt to determine the most efficient method of applying rail anchors.

As mentioned previously, all trains move northward on Number 3 track. Therefore, except to take care of some back-up movement, it was necessary that the anchors be applied against Northward creepage. Eight



Plan of Rail Anchor Tests on Track No. 3.

different methods of applying the anchors were used as follows:

Mile 47—An anchor on each side of the first tie away from the joint bar at the receiving end of each rail; an anchor on the south side of the next six ties; and an anchor on both sides of the eighth tie. (No anchors on opposite rail at any of these ties.)

Mile 48—An anchor on each side of each of the first four ties away from the joint bar at the receiving end of each rail. (No anchors on opposite rail at any of these ties.)

Mile 49—An anchor on each side of the first tie away from the joint bar at the receiving end of each rail; an anchor on the south side of the next four ties; and an anchor on each side of the sixth tie. (No anchors on opposite rail at any of these ties.)

Mile 50—an anchor on each side of the second tie away from the joint bar at the receiving end of each west rail; an anchor on the south side of the next six ties; and an anchor on each side of the eighth tie. (Opposite rail, leaving end, anchored similarly on same ties.)

Mile 51—An anchor against the south side of eight ties opposite joint in the middle of each rail, with an anchor on the north side also of each end tie of each group. (No anchors on opposite rail at any of these ties.)

Mile 52—Ten anchors, one placed against the south side of each alternate tie, commencing with the second tie away from the joint bar. (Opposite anchors in all cases.)

Mile 53—Ten anchors per rail length, eight against the south sides of eight ties, with two ties, one in each quarter, "boxed in". (Opposite anchors in all cases.)

Mile 54—Eight anchors, one placed against the south side of the first tie away from the joint bar, and then on the south side of each third tie. (Opposite anchors in all cases.)

Representatives of the A.A.R. set 72 test points, 8 on each of the 8 miles, with A.R.E.A. anchor arrangements, and 8 on Mile 55, anchored by the Illinois Central method, which calls for eight anchors, four on each half rail, on alternate ties commencing with the third tie from the joint.

The switches in the test installation are equipped with Ramapo Ajax Type M head rods, and at interlocking plants with Type MF front rods for locking the switches. These rods are vertical rather than flat, and have a swivel bearing clip of cast steel, machined to insure that the switch point will lie up tight against the stock rail. This alone will keep the points from rolling.

The Type MF front rod for locking at interlocking plants has a cast steel swivel clip in place of our present curved rod.

Switch heel and turn-out plates are 1 1/8 in. thick, milled to a 3/4-in. seat, giving a 3/8-in. shoulder which will help hold the line back of the heel of switch. Milled plates are also used at the heel and toe ends of frogs, with 1-in. holes for screw spikes to keep the frogs in line.

Three miles in the middle of the 20-mile test track are laid with new 7-in. by 9-in. by 8 1/2-ft. creosoted crossties out-of-face. Pine ties were used on Mile 43, gum ties on Mile 44, and oak ties on Mile 45. Renewals on the remaining 17 miles were spotted in with 7-in. by 9-in. by 8 1/2-ft. oak, gum or pine ties, replacing the 6-in. by 8-in. by 8-ft. ties in place. The purpose of this test is to compare pine, gum and oak ties.

The north 10 miles of the 20 miles of 131-lb. track were raised approxi-

(Continued on page 136)

Many Rail-Laying Programs Were Delayed in 1943 for Lack of Sufficient Labor, and the Prospects Are Not Bright for 1944

How Can Shortage

THE shortage of labor which first became apparent early in 1942, and which became critical for some classes of labor and in some areas in the latter part of that year, has continued to develop until all areas and all classes of labor are now affected much more severely than was true a year ago when this committee made a similar study of the conditions that prevailed then.*

Reports as of October 1, 1943, from chief engineers and engineers maintenance of way of 40 roads in the United States and Canada, representing approximately 210,000 miles of road, show that there is a universal and acute shortage in extra-gang labor, ranging up to 70 per cent. With few exceptions, there is also an overall shortage in section labor, with extreme shortages in terminals and in areas surrounding war industries, extending 50 to 75 miles from those centers. Away from cities and industrial areas, however, the shortage of this class of labor has been less acute and many sections have been able to maintain their full forces during the year.

Varying with the locality, the shortage in bridge and building forces range from slight to 50 per cent. In not a few instances, older or more skilled helpers have been upgraded to the rank of carpenter, partly as an inducement to remain in service. Although this action may have been warranted both as a means of recognizing ability and as a measure to keep forces, it has tended to increase the deficiency in helpers.

All but two of the railroads report shortages in signal maintainers and helpers in amounts ranging from 10 to 70 per cent. Only one road reported that it is having little difficulty in obtaining the men it needs for signal maintenance. However, those roads that have kept their signal maintenance forces most nearly to their authorization, have been able to do so only by hiring inexperienced men. As with bridge and building forces, the greatest loss is in helpers. Machine operators comprise another class of labor in which there is a shortage, not so much in numbers as in dependable men of experience.

Situation Growing More Acute

While the shortage is acute in practically all parts of the country, it varies in degree in different areas, being generally greatest in the larger cities and around those war industries that are away from the larger centers of population. In agricultural districts, less difficulty is experienced in obtaining track labor locally, but this labor must be worked locally, for few of the men who can be recruited are willing to work away from their homes.

The labor situation is definitely more acute than it was a year ago and engineering officers are convinced that it will grow more acute progressively as married men, upon whom they have heretofore been able to rely to some extent, are inducted into the armed forces. In general, the migration to war industries has slowed down of late, or ceased in some areas, while in others there is a reverse movement. Experience shows, however, that this form of relief is temporary and localized, since many of the men thus made available are unattached or come from other areas and drift away in a short time in search of higher wages and shorter hours.

In some sections, there is little or no difficulty in hiring men, but the turnover is so great that the net effect is that of a shorage of labor. This continual turnover has kept gangs in such a chronic state of disorganization that their actual output has been well below normal.

There is general agreement that the usual sources from which labor has been obtained heretofore have been exhausted, and that such labor as can be obtained from now on must be drawn from other industries or occupations, but that, because of differentials in wages, there is little prospect of relief from this source, even from non-deferrable occupations. In most cases, even in agricultural areas, no reservoir of native labor remains, although recent rulings of the Manpower Commission may make it possible to employ agricultural laborers for short periods during slack seasons on farms. However, these periods commonly occur when they are of least constructive value for maintenance.

How much has the differential in wages paid by the railways and other industries contributed to the loss of men? It was the considered opinion of practically all of the officers participating in this study that, excluding those who have been inducted into military service, this is the principal factor contributing to this loss. However, several officers are of the opinion that this is not a contributing factor at this time, or that its effect is of little importance now, because practically all of

*See A.R.E.A. Proceedings, Vol. 44, Page 292.

In MANPOWER Be Overcome?

With the maintenance of way departments of the railways confronted with the most severe shortage of labor in history, and a shortage which promises to become still more acute, the Committee on Economics of Railway Labor of the American Railway Engineering Association, through one of its sub-committees, of which Elmer T. Howson, editor, *Railway Engineering and Maintenance,* is chairman, made an exhaustive study of maintenance of way labor conditions over the country and of the measures that have been tried or adopted to overcome the shortages that have existed. The results of the committee's investigation are presented in large part in this article

the men who might be attracted by higher wages have already left railway service. There was equal unanimity that this differential in wages is hampering efforts to recruit men.

The majority of the roads are working some or all of their gangs either nine or ten hours a day. This practice has two purposes, the accomplishment of more work and permitting the men to earn more money. A few roads that had previously paid overtime only after 10 hours are now applying this rate after eight hours.

Last year, as the cost of food increased, a few roads undertook to absorb this increase in their charges for board as a means of holding men. At present, this practice has been greatly extended, with varying success. Both of the major roads in Canada are paying a cost-of-living bonus to their employees, and one is also absorbing the increased cost of food in its labor camps.

During 1943, as during 1942, the committee found few marked departures from previous practices in hiring labor, although local solicitation has been intensified and there has been a much greater use of established agencies for recruiting men, as well as an extension of the practice of transporting to the work daily, men who refuse to accept employment away from home. A number of the railroads have taken advantage of government agencies with varying degrees of success.

A large number of roads are carrying advertisements in local papers along their lines and are using posters in stations and about the towns to call attention to their need for men. One road has been able to hire men in towns off its line because it has arranged with local owners of automobiles or trucks to transport them between home and the job. Another road has gone to outlying farms in the same way, with some degree of success. Still others have established labor offices in the larger labor centers to supplement existing agencies.

Other expedients that have been tried include the solicitation of high-school boys and working through country agricultural agents. Throughout Canada, it is necessary to obtain additional labor through the Dominion Government Selective Service Commission.

Housing and Food

Even the most casual consideration of the discussions by the officers participating in this study indicates clearly that the present labor stringency has impressed them deeply with the need for improved housing and better sanitation at their labor camps, whether fixed or itinerant. Almost all of the roads reported that they have improved their housing facilities in recent months, and not a few roads have extended this campaign to include homes for section foremen and section laborers.

Several roads that have not maintained fixed camps previously have

Conclusions of the Committee as to Practicable Means of Increasing the Supply of Maintenance of Way Labor

(Not in order of importance)

(1) Extension of the working day to nine and ten hours.
(2) Recalling pensioned employees—this has been of little benefit.
(3) Retention in service of employees reaching retirement age.
(4) Obtaining deferments from military service.
(5) Obtaining honorable discharges for men over military age.
(6) Up-grading semi-skilled employees.
(7) Relaxing age and physical requirements for employment.
(8) Contracting building maintenance.
(9) Intensified solicitation, including advertising.
(10) Expansion of employment department.
(11) Use of established employment agencies.
(12) Use of government employment service.
(13) Working through country agricultural agents to develop new sources of labor.
(14) Establishment of more labor camps.
(15) Better housing in both fixed and itinerant labor camps.
(16) Improved food in labor camps.
(17) Absorption of increased cost of food for floating gangs.
(18) Transporting labor to and from work.
(19) Employment of women.
(20) Employment of foreign labor in groups.
(21) Employment of war prisoners.
(22) Employment of civilian internees.
(23) Employment of high-school boys.
(24) Part-time employment of professional men, merchants and others living in communities along the line.
(25) Institution of training course for skilled workers.

found it necessary to establish such camps, and have built them along modern lines. One road has erected a number of fixed camps of prefabricated frame buildings and has even used these buildings to house extra gangs not moved frequently.

It is probable that in the past no feature of labor camps has been of more importance in the recruiting and holding of men than food and the way it was served. Maintenance officers have long recognized the importance of food and its preparation, so that it is not surprising to find that they are today giving it equal consideration with housing. It is well established that if special attention had not been given to food, some roads would now be in much worse position with respect to labor.

Deferments

In general, the same policies are being followed with respect to deferments as prevailed last year—that is, they range from no requests for deferment to asking for the deferment of all employees. However, as the labor situation grows tighter, more attention is being given to the retention of the men who remain, even including laborers. As the demand for more men for the armed forces has increased, many of the selective service boards have begun to "scrape the bottom of the barrel," and it is becoming more difficult to obtain deferments for other than key men who are irreplaceable. On the other hand, the recent circular of the Selective Service listing critical occupations, has been of benefit, and a number of roads have prepared replacement schedules which are giving better results. The action of the Selective Service boards follows no apparent pattern. Some roads report that substantially all of their requests are granted, while others report that all but a limited number, principally for highly skilled or technical men, have been refused. Taken as a whole, the roads report a reasonable degree of success, except for track laborers, and where the shortages are extreme, some boards have granted deferments to this class of labor.

Practically all of the roads have given consideration to the recalling of pensioned employees, especially foremen and those who are skilled in some phase of maintenance. Those roads that have gone so far as to solicit the return of these men have found, however, that the results have been negligible, for most of these men have "softened" to such an extent that they are no longer able to stand strenuous work.

Information incorporated in the previous report of this committee indicated a rather widespread relaxation of the upper age limit for persons entering the maintenance forces; generally, this limit has been raised from 45 to 55 years, although a few roads have gone to 60 years and others have fixed 50 years as the maximum. At the other extreme, a few roads have lowered the age at which men can be hired to 19 years, and a smaller number have gone as low as 16 and 17 years.

Substantially all of the roads have also relaxed their physical standards, for they recognize that fully able-bodied men are no longer available. Minor defects are overlooked generally and in some cases men possessing major defects are hired, provided these do not incapacitate them from work and they are willing to sign waivers for personal injury claims. One exception, however, that seems to be general, is that of defective vision.

Employment of High-School Boys

By the time the 1943 active working season opened, the usual sources of labor had so nearly dried up that it became necessary to tap new sources if the work was to be done. One road was alert to the possibility of using high-school boys and made extensive preparations to do so. While a few of the boys were used successfully over week-ends before school closed, the real preparations were made for full-time vacation work. The boys were segregated from other gangs and kept in camps of their own, where special provision, including recreational facilities was made to care for them. Generally, the athletic coach accompanied them, acting as their leader and monitor and keeping their time. This experiment was rated as a success, and this road reports that this form of employment is now being encouraged to the fullest extent.

Two other roads reported that they had followed a similar plan with success, but as one of them was able to obtain only about 60 boys, they did not supply a very large percentage of the labor needed. Numerous other roads also employed limited numbers of high-school boys in their regular gangs. A number of the roads are still continuing to employ them part time over week ends since the schools opened.

Part-Time Workers

Probably the most notable and dramatic innovation in the utilization of labor from new sources is that which took place on the Pacific coast during the past year, where one road obtained surprising results through the week-end employment of lawyers, doctors, bankers, school teachers, college professors, students, storekeepers and other "white collar" workers from the towns along its lines. During the spring and summer, a large amount of track and other maintenance work was completed by these workers. In addition, some of those who possessed sufficient skill were placed in bridge and building gangs, and a few were utilized in a wood shop operated by the engineering department.

Women

At the time the previous report of this committee was prepared, only four roads were employing women in maintenance of way work, and one of these was using them only as crossing watchmen. It is of special interest, therefore, that since that time the shortage of men available for maintenance of way work has become so critical that 20 of the 40 roads whose activities we have analyzed are now employing women for various purposes, and others are considering this expedient for 1944. Three roads report that they have tried to organize gangs of women without success. Almost without exception, however, those roads that tried this expedient are planning to expand their effort during 1944.

Almost all of the roads that are employing women, including those that are making the most extensive use of them, are using them for such work as policing station grounds and yards, tending switch lamps, flagging crossings, oiling switches and rail joints, weeding track, dressing ballast, tightening bolts and other similar work. In addition, one road reported that women are icing cars and taking care of fruit shipments—tasks formerly done by section men.

Seven roads report women doing section work, and four of these roads are working women in extra gangs. Those roads which have achieved the greatest success in the employment of women have found that they obtain the best results by segregating them into all-women gangs.

Experience has shown that women can raise and surface track, and put in ties and tamp them, but are not effective as spikers. For this reason, where these classes of work are to be undertaken, it is desirable to have one or two men in the gang, depending on the number of women employed, to do the spiking and the heavier work of handling the ties. In addition to the work incidental

to section and extra gangs, one road is using women as painters, and several others are employing them in bridge and building work.

War Prisoners

In view of the large number of war prisoners now in the United States and Canada, inquiry was made whether consideration has been given to their employment. One road in Canada reported that it has 40 Italian civilian prisoners in its employ, who have not been in service a sufficient time to determine whether they will be satisfactory. Only one road in the United States reported such employment—that of German and Italian sailor internees. This road reported that these men were one of its best sources of labor for extra-gang work, and that they had given good service.

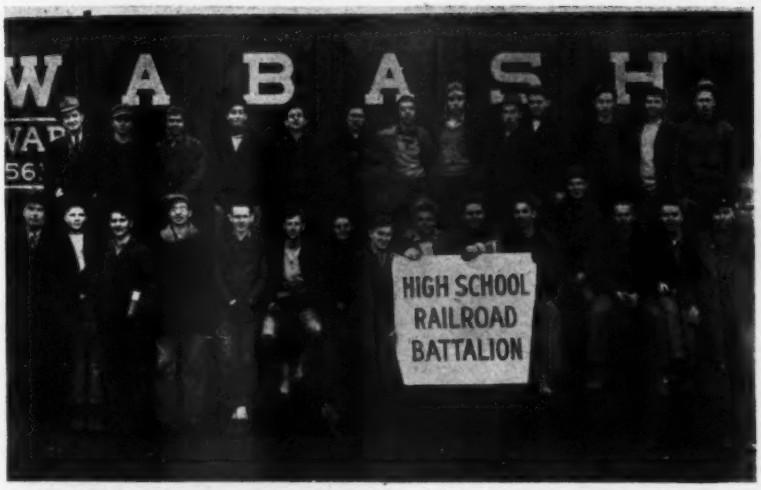
A relatively large number of roads have given consideration to the employment of war prisoners in maintenance; 12 roads report that they have investigated the possibility of obtaining labor from this source and 8 of them have made application for prisoners. Some of the latter met with refusal, while others received no reply to their requests.

Foreign Labor

None of the roads participating in the study has employed imported groups of foreign nationals, except from Mexico, of which a considerable number were imported before the Mexican government suspended the movement. A number of roads report that their employment of Mexican labor has ranged from 500 to 750 during the year, substantially all of whom have been placed in extra gangs. One road that did not participate in this study employed a gang of Japanese internees with success. One road that used gangs of Mexican nationals in 1943 advises that they were unsatisfactory by reason of absenteeism and indulgence in liquor. Other roads, however, report them as satisfactory.

Owing to the difficulties they have experienced in obtaining native labor, many roads are giving special consideration to the possibilities of employing Mexican or other foreign labor in 1944. Some of these roads now have negotiations under way looking to this objective, while others are awaiting the outcome of further negotiations between the United States and Mexico, before making similar applications.

In general, the foregoing includes all of the important means that have been employed to increase the number of laborers and skilled workers by the roads under study. However, two variations in the methods that have been discussed were reported, these being the employment of Jamaican negroes and the recruiting of American Indians. The Jamaicans, who were employed as a ballast gang on one Mid-Western road, were ineffective and unsatisfactory, but the Indians, who came from New Mexico, did good work.



High School Boys Helped Out on Many Roads During the Summer

Other means of obtaining men not already discussed include obtaining honorable discharges for former employees who are beyond the age for effective military service. Also, several roads have contracted as much of their building maintenance as possible, to relieve regular forces.

Efficiency Down

Without exception, the officers who participated in the committee's investigation agree that the labor now obainable is definitely less efficient than that of prewar days, although their estimates vary from 50 to 75 per cent, compared with two years ago, the majority placing it at about 60 per cent. In general, a part of the inefficiency results from lack of experience.

The major reason for the decrease in efficiency is attributed to relaxation of the former age and physical requirements. Another reason mentioned by several officers is the growing independence, or insubordination, on the part of casual workers. A considerable number of roads report no noticeable drop in the efficiency of men working on sections.

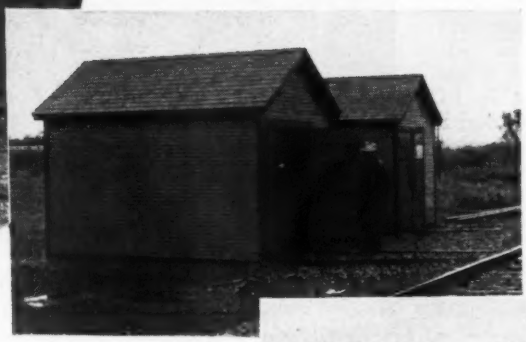
The shortage of labor which began early in 1942 has increased greatly in severity during the last year, until it has now become critical in all occupations and in all but a few circumscribed areas. While two causes are primarily responsible for this situation, namely, the continued induction of men into the armed forces and the expanded competition of industry with the higher wages it offers, a collateral cause is the extraordinary increase in traffic which has made necessary larger forces to maintain tracks and structures in condition for the prompt and uninterrupted movement of this traffic.

Information gathered from every section of the United States and Canada indicates that no relief is in sight, but rather that the present shortage of men will continue and will become more acute.

Conclusions

1. Labor is the number one problem of the railways and their maintenance of way officers today;
2. No single measure will meet all requirements; an expedient that may be successful in one case may fail in another. Maintenance officers must study conditions on their individual roads, search out all possible sources of labor and apply all measures they believe will develop some labor.
3. Maintenance officers must revise their thinking with respect to many practices of long standing, devise expedients of various kinds to attract labor, develop new sources, and intensify solicitation from established sources. Possible measures include (See 25 suggestions in box at beginning of this article):
4. A new situation has arisen with respect to labor, in which many conceptions must be discarded, at least for the present. Labor must now be handled on a realistic basis in conformity with actual requirements, rather than on the basis of preconceived ideas or wishful thinking.

Builds Section From



M-K-T builds more than 225 frame structures at central bridge and building shop—and transports them to points over the system on flat cars. Assembly line methods, with as many as 15 houses under construction at a time, and extensive use of reworked car siding and decking, keep average cost down to approximately $120 per unit, complete with tool racks and bins

Three Views of Some of the New Tool Houses Recently Constructed of Second-Hand Car Lumber on the M-K-T

IN connection with an extensive program of line rehabilitation and the repair or rebuilding of hundreds of its freight cars to keep pace with the heavy demands of war traffic during the last two years, the Missouri-Kansas-Texas has taken advantage of the opportunity to rid its property of many old, inadequate and often unsightly section tool houses, replacing them with prefabricated units, built on a mass-production basis from released car lumber at a central bridge and building shop, and transported on flat cars to points of use. To date, in a program that still continues on a modified scale after the more urgent needs have been met, more than 225 tool houses have been built, moved out and set up along the line.

The work of building the tool houses, which was begun late in the summer of 1942, has been carried out at the road's bridge and building shop at Denison, Tex., where the road also maintains extensive mechanical department facilities, including a large freight car repair shop. This location for the work has not only made the released car materials readily available to the carpenter forces building the houses, but has also been an advantageous point from which to ship the completed houses to points over the road.

All of the tool houses are of a standard design and are constructed of wood throughout, except for their roof covering, door hardware and window glass. As shown in the accompanying drawings, they are 14 ft. long by 10 ft. wide; are 12 ft. high to the ridge of a simple double-pitched roof; have double, side-hinged doors, providing an off-center door opening 6 ft. wide by 7 ft. high; and have a single window in one side. Foundation sills are of new 6-in. by 8-in. creosoted pine, set on edge, and the doors are of new 1⅝-in. by 6-in. tongue and groove pine. With these exceptions and a small amount of trim, the houses are entirely of second-hand car lumber. Studs, rafters and roof joists, all 2-in. by 4-in. material, are cut from released car decking, while all of the material used for siding and roof sheathing is cut from released car siding, and is 1⅝ in. by 6 in. and 2 in. by 6 in., respectively, in section. New asbestos-cement shingles have been employed as the roof covering, and the exteriors of all of the houses receive two coats of lead and oil paint in the recently adopted standard colors of the road, an orange-yellow body with black trim.

Fittings within the house include essentially an oil barrel rack, a cupboard and bins for small tools and various types of track fastenings—all constructed from reworked car lumber. Standard plans call for providing the houses with 2-in. plank floors, but in most cases, owing to the shortage of lumber, this detail has been modified to permit floors of cinders, chats or rock screenings, whichever the site of each house affords most readily. In all cases, the rails of the motor car tracks within the houses, of either scrap rail of light section or 2-in. by 4-in. wood strips, are supported on new 6-in. by 8-in. creosoted timbers, which were laid flat.

Assembly Line Construction

When the work of building a large number of these houses was assigned to the bridge and building shop, the work was lined up on a mass production basis insofar as possible, from the cleaning of the old car lumber to the final painting and loading

Tool Houses

Second-Hand Car Lumber

By Mass Production Methods

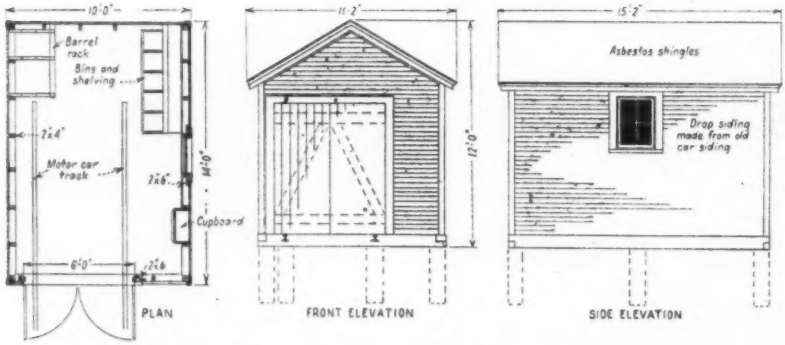
out of the units. One of the first steps to this end was the building of three construction ways, each consisting of two lines of 6-in. by 8-in. timbers, at right angles to an available track adjacent to the shop, and with their top surfaces about 18 in. above the ground level. Each of these ways was 70 ft. long, making it capable of holding five or six houses in various stages of construction. Construction proceeded from the ends of the ways most distant from the loading track, and, as in assembly line construction, as one unit was moved off the production line onto a flat car, the succeeding units on the way involved were pinched or jacked laterally to new working positions, making room on the receiving end of the way for the laying out of a new foundation. All of the houses were built with their lengths at right angles to the ways to conserve space, and also so they could be loaded lengthwise on the flat cars without turning them, and were kept spaced a sufficient distance apart during construction to permit free movement around them.

Above — Applying the Roof Sheathing and Doors. Right— View of the Construction Ways, Showing Yard Arrangement and Tool Houses in Various Stages of Construction

Gang Organization

During the peak of the work of building the houses, a force of 16 to 18 carpenters, helpers and painters was employed, each of the men being assigned to specific operations. The power tools and machines available at the shop for doing the work included a sticker or molder for refacing the car siding into a novelty-type drop siding, a ripper, a cut-off saw, a band saw, a jointer and a planer.

In the gang organization, three or



Plan and Elevations Showing Design Details of the New Houses

four men were usually assigned to cleaning and removing nails from the car lumber, and four or five other men sized the lumber for the various uses in the houses. Other men were assigned to laying out the foundation sills and erecting the wall framing; others to the roof work, applying the siding and shingles, and the building and hanging of the windows and doors. Still others installed the racks and bins. To a large extent, these men were employed continuously on specific operations, but their organization was adjusted from time to time as necessary to keep the different operations fully synchronized and thus insure the maximum rate of production.

In the same general manner, the painting was carried out, the body work with spray guns and the trim with brushes. Before painting, all old bolt holes in the siding were plugged with a plaster-cement compound, which was secured in place by crossing two three-penny nails in each hole as reinforcing. This material was merely pressed into place with the thumb or a putty knife and allowed to dry before painting.

Loading and Unloading

When one or more of the houses were completed, a flat car was spotted on the adjacent track for loading. In the loading operations, the completed house was jacked up and made to rest on four 5-in. steel dollys, by means of which it was rolled laterally out over timber stringers onto the car deck. On the deck, it was securely blocked into place and further secured by wire ties fastened around the foundation sills. One, two or three houses were loaded on each car, depending upon its length and its proposed movement over the road.

Unloading of the houses was done by the section crews to whom the houses were assigned. This was done in several ways, but the practice adopted most generally was to insert two track rails horizontally under the house for use as lateral skidways, and then to pinch the house sidewise until, overbalancing the side of the car, the rails sloped down to the ground level, forming a ramp for the further movement of the unit. From this point on, the house was allowed to move down of its own weight, restrained only as necessary. On the ground, it was jacked up and pivoted around to exact position at right angles to and 10 ft. out from the nearest track rail.

Installation

Levelled up, with the top of its foundation timbers eight inches below the top of the adjacent running rail, and provided with a floor and motor car set-off rails, the work was completed, usually in a matter of less than two hours. In a few instances, where soft ground conditions dictated, the houses themselves and the timbers carrying the motor car rails were given support on treated pile stubs, as shown in the accompanying plans. In most cases, however, this expedient was not necessary.

The system of building tool houses discussed was devised by Superintendent J. J. Gallagher of the North Texas district of the M.K.T., who sold the idea to Matthew S. Sloan, board chairman and president. The work was carried out by district forces under Mr. Gallagher's direction.

N. & W. Makes Annual Track Awards

BASED on its annual track inspection made late in 1943 by committees of general and division officers, the tracks of the Norfolk & Western are now in better condition than ever before. As a result of this inspection it was found that the average track rating for the entire system had attained the all-time high of 9.42, or two points more than the previous high of 9.40, which was reached in 1941 and 1942. The average for 1943 represents a gain of 18 points over 1933, when the system-wide rating was 9.25. The rating of 9.50 is the highest that can be given.

Among the company's five divisions, the Scioto division, with a rating of 9.45, held first place. In 1942, the Shenandoah division, with a rating of 9.44 was the highest ranking division. Among the terminals, first place was held in 1943 by the Roanoke terminal, which was also given the rating of 9.45. Last year, it was the Norfolk terminal, with a rating of 9.44 that held first place. Among the roadmasters' territories, three districts were tied for the high rating of 9.46. These were the Gilmerton-Church Road district of the Norfolk division, and the Greggs Hill-Columbus and Vera-Cincinnati districts of the Scioto division.

In accordance with past practice, the road awarded cash prizes to the track foremen whose territories held first, second, third and fourth places on the different districts. A total of 81 section foremen received such prizes, which included 21 first prizes, 24 second awards, and 18 prizes each for third and fourth places. Among the section foremen, seven were tied for first place, each with the unusually high rating of 9.49. These were:

H. B. Cralle, Evergreen, Va.; C. B. Smith, Starkey, Va.; J. W. Neikirk, Max Meadows, Va.; C. H. Felty, Neal, W. Va.; J. H. Valentine, Franklin Furnace, Ohio; W. V. Crosby, Lockbourne, Ohio; and Ernal McCann, Sardinia, Ohio. The greatest improvement among section foremen's territories was accomplished by W. H. Collins, Christiansburg, Va., whose rating of 9.29 was 19 points higher than in 1942.

Motor-Driven Turbine Deep-Well Pumps Increase Efficiency from 25 to 75 Per Cent

Electric Pumping Will Save Critical Materials

By C. R. Knowles

Superintendent Water Service (Retired)
Illinois Central, Chicago

In this article Mr. Knowles shows that worth-while savings in critical materials can be made by changing from steam or oil-engine operation of railway water pumps to electric operation. He also points out that surprisingly large savings can be made in labor, in maintenance materials, in the consumption of fuel and in the use of cars by this change in power employed for pumping

PERSISTENT search for more economical methods and better results has been an outstanding characteristic of railway maintenance officers ever since the railways came into existence. This is well illustrated by the centrifugal pump. As electric power became available with the gradual extension of distribution lines into many sections of the country, this form of power came more and more into favor because of the economies that were possible through its use.

Largely because of the speed of the electric motor and of the oil engine which was also coming into widespread use about this time, it became possible to utilize the centrifugal pump. At that time, however, the only pumps of this type that were available were low in efficiency and were afflicted with other undesirable characteristics. Despite these handicaps, water service engineers persisted in their use, primarily because they possessed advantages that offset in considerable part their undesirable features. As a result of the knowledge gained through this use, improvements in design have been made that have placed them on a relatively high level of perfection.

Marked Economies Effected

Growing directly out of these developments and of the wider use of electric power, which has permitted a considerable reduction in rates, marked economies have been effected in the cost of pumping water for railway purposes through the installation of electric-driven pumps to replace steam-driven pumps and steam power plants, as well as oil engines. While these economies are important from the viewpoint of railway operation and maintenance, it is of even greater importance during the present war emergency that this form of pumping is capable of making an immense saving in fuel, in labor, in materials and in the release of coal and tank cars, all of which are needed urgently in the war effort. Installations of this type now in service are realizing savings in all of these directions, but there still remains a wide field in which this method of pumping can be extended to the advantage of the war effort. In fact, any one of the savings that have been mentioned should be sufficient to justify the replacement of other methods with electric pumping, where this is feasible.

A quarter century ago there were only a few electric-driven pumping units in use on the American railways. In the relatively short period that has since elapsed, the continual improvement in this type of equipment, including both the pump, the motors and the incidental devices, has been little short of phenomenal, and has brought this form of power into general favor for pumping. As a result there has been a marked increase in the electrification of railway water stations, particularly during the last decade. This is indicated quite definitely by the predominance of this type of equipment in the annual purchases of the railways. From these purchases, it is estimated that there are now about 3,600 railway water stations, out of a total of 16,700 in service, that are now operated by electrical power. This represents only slightly more than 20 per cent of the total number of water stations in service. Many of the remaining steam and oil-operated stations, estimated to be 40 per cent of the total, are readily adapted for electric pumping, with the result and economy which this method affords.

They Are Dependable

Modern electric pumping units are dependable and efficient and are adapted particularly for automatic and remote control. The dependability of electric power has improved as its use has increased. Also, new

and better electric equipment and distribution systems have been developed as the demand for electricity has grown. With these greatly improved conditions in the power industry, very few pumping stations now experience power interruptions for more than a few hours at most and these infrequently. Through the interconnection of power lines, power is or can be supplied from more than one source at many points throughout the country, so that any power interruption that may occur is usually for a few minutes only, that is, for just long enough for a switch at a power-distribution station to be thrown, and in some instances the switching is automatic.

In some instances it has been the practice to leave the oil engine or the steam power plant and steam pumps in place when an installation of electrically-driven pumps was made, to protect the plant against a possible power failure. However, this practice is a hang over from the days, only a few years ago, when interruptions did occur more or less frequently and, in many instances lasted long enough to create an emergency. This is rarely necessary or advisable today, first, because interruptions occur so infrequently as not to create a problem and, second, because the standby units, not being used, deteriorate rapidly and, when the need for them airises, may be in such poor condition that they cannot be used.

For several years the movement to replace outmoded steam and oil-engine-driven pumping plants with modern electrically-operated stations has been at an accelerated tempo. But during the last two years this movement has been greatly retarded by the advent of the war, by reason of the diversion of critical materials required for the manufacture and installation of electric pumping equipment and power units into other channels. Yet, a careful study indicates that the replacement of steam and other types of pumping facilities with electrical equipment will actually release a much larger volume of critical materials than required for the electrical installation.

Save Critical Materials

In every case where electric pumps are installed, they release pumping equipment materials. As an example, an electric-driven centrifugal pump and motor of the horizontal-shaft, split-casting type, with a capacity of 500 gal. per min., will weigh from 760 to 980 lb., depending on the speed of operation. This unit will release a steam pump of the same capacity and a boiler, with a combined weight of from 10,000 to 12,000 lb., or, in some cases, even more. If it replaces an oil engine and a centrifugal pump, it will release from 5,000 to 6,500 lb. of material, depending on the type of drive employed. In the case of a deep-well pumped by an air-lift system, a 500-gal. turbine pump and motor, with a total weight of 3,700 lb. will take the place of an air compressor and a boiler, or an oil engine, representing weights ranging from 20,000 to 25,000 lb. The difference in weight per unit is roughly 9,000, 5,000 and 16,000 lb., respectively.

From the standpoint of economy, one of the principal advantages of the electrically-operated pumping station is that is can be put under automatic control, thus eliminating the cost of attendance. Aside from any question of economy, however, this feature may be of vital importance during the present acute shortage of labor, since the electrification of a steam or oil-operated pumping station will release labor required for other essential work. Each water station operated by steam or by an oil engine requires from one to three men, depending on the amount of water pumped and on the wayside storage available. The release of only one man at each of the 3,600 water stations now served by electrically-operated pumps, has made 3,600 men available for other work.

Another feature of the electrically-operated pumping station, which is of real advantage in this period of labor and material shortages, is that, as a rule, it requires much less maintenance than stations using other forms of power. Many of them will operate for months with no other attention than the filling of the oil cups once or twice a month, and an occasional inspection by employees on their regular tours of duty. Ball-bearing motors and pumps of the grease-lubricated type will run for six months with a single greasing. This lower maintenance requirement affects a further reduction in the labor required, compared with that for regular attendance.

Still another advantage of the eletric-operated pump is that it requires much less space than any other type of pump and power unit, so that the housing requirements are reduced accordingly. A building 10 ft. by 10 ft. in plan, with an 8-ft. ceiling is usually ample for an electric installation, compared with a house 12 ft. by 16 ft. for an oil engine and pump and a house, say, 16 ft. by 24 ft., with a ceiling 12 to 14 ft. high to accommodate a steam pump and boiler. Again, electric operation decreases the fire hazard materially, and the problem of heating the building is simplified because it is necessary to maintain a temperature only just above freezing where the horizontal-shaft type of pump is employed. Small electric heaters controlled by thermostat may be used for heating the pump house, since they involve only a small expense, provided the building is insulated.

No provision for heating is necessary for deep-well turbine pumps or where the bowls of turbine pumps are submerged. In fact, this type of pump requires no housing, except under the most severe weather conditions, as modern motors are completely weather proof. Many installations of this kind in temperate zones have been in service without housing for years. Where oil reservoirs are exposed to freezing temperatures, a small heating element in the reservoir will heat the oil automatically to a temperature that permits it to flow freely. Where no housing is provided, the motor is usually enclosed by a fence to prevent tampering by trespassers.

Motor-Driven Centrifugal Pumps Save from Five to Six Tons of Critical Materials

Saves Tank and Coal Cars

Not the least of the arguments in favor of electricity for pumping is that it releases tank and coal cars

(Continued on page 135)

Looking Back Over 1943—

A Guide to 1944

THE extent to which maintenance men were able to complete their programs during the past season and the measures which they took to overcome or offset shortages in labor and materials are reviewed in the following abstracts of four addresses before a recent meeting of the Maintenance of Way Club of Chicago. These addresses were presented by officers from railroads extending east, west and south of Chicago and a terminal railway. They discuss the problems the railways faced during 1943 and may expect to face during the present year.

Labor the Principal Problem

By E. J. Brown
Engineer of Track,
Chicago, Burlington & Quincy, Chicago.

WE did not have an easy task during the last season in attempting to complete our maintenance program. Our principal difficulty was the shortage of labor, which was the most acute in my experience. To offset this shortage, we first resorted to hobo labor for our extra gangs. Each summer for many years we have tried to organize a system rail laying gang. Our goal for this gang is 150 men, but last year we failed to come even close to that number. In fact, the number of men in this gang dwindled to such a low point that we scarcely had a gang. It was necessary, however, that we lay the rail allotted to us and in order to do that, we resorted to a number of expedients. Among other measures, we supplemented this gang by section forces, which were transported to the job by trucks and motor cars. By such means we were able to lay the rail which was allotted to us.

On one of our second-hand relays, we were successful in organizing a gang of high school boys, with their coach as timekeeper, who did a very good job and liked the work very much. However, at harvest time the gang disbanded for most of them were farmer boys and had to go back to their farms. While we had them, they accomplished a great deal.

Used Jap Labor

We also resorted to Jap labor and still have two gangs, one on the Burlington lines proper and the other on the Colorado & Southern. These men were recruited at Heart Mountain, Wyo., and were interviewed by track supervisors before they were hired. After they were signed up, it was necessary to clear them with the F.B.I., and with the governors of the states in which they were to work. The gang on the Colorado & Southern was used in laying rail and these men were so enthused with their job and liked the foreman so well that they gave a birthday party for his wife. This gang was one of the cleanest, best-organized groups of men that I have seen for a long time. These men are citizens and were of good standing in their communities. Some were pretty well off in the world's goods and it was not easy for them to adapt themselves to swinging a spike maul or shovel, but they did a good job. We were asked to discourage their mingling with the town folks; they realized their position and most of them remained in groups around the camp. We had no trouble with them.

We are engaged in the construction of a large hump and classification yard at one of our important terminals. When approval of this project was finally received from WPB, we tried to recruit enough men to handle this job, but found this so difficult, we had to contract track laying and ballasting, as well as the grading.

Transported by Truck

In much of our work last summer, we resorted to trucks to transport our men and found that this saved much time. This also enabled us to bring gangs to points where there was a shortage of labor. Our situation was quite spotted with regard to section labor. For example, we had more section men on one of our southern divisions than ever before and were able to surface about 70 miles of track on that division by reason of having this help. However, when we tried to move these men to another subdivision, providing transportation by trucks and paying them from the time they left the initial starting point until they returned, none would go. On most branch lines, we found that men want to work

near home. We tried several times to move men, without success.

At the close of the season, we were working about 50 per cent of our authorized extra gang forces in our larger terminals like Chicago. Some of our sections in these terminals had no men at all. In such circumstances, the maintenance officer had to devise other ways to get his work done. By supplementing extra gangs on the line with what section forces we had, and section forces in terminals with extra gang help, we were able to keep our railroad in a safe condition.

It is said that every problem solves itself ultimately and this was largely true of our shortage of materials because the lack of labor, in many cases, made it difficult to use more material than we were able to secure. For example, we opened three additional sources of rock and gravel ballast, and had contractors producing ballast at these locations. They, too, had difficulty in obtaining labor and if we had had the track forces we anticipated, they would not have been able to supply us with sufficient to complete our program.

Located within the city limits, with war industries all around us, we were unable to secure high school labor this summer. The boys preferred the higher pay and easier hours to be found in war plants. At Clearing we maintain a labor camp. Because of the shortage of labor, we fixed it up and made the boarding rates for the men as low as possible. However, we had no men in that camp and were not able to get any. Our older employees helped greatly by working longer hours. This, however did not attract new men for money is no attraction to them if long hours are necessary to earn it.

Knowing that the handling of snow this winter will be a serious problem with the labor shortage, we asked permission of the WPB to install gas snow melters at our most important interlocking plant on the C. & W. I. but our request was turned down. However, after revising our request downward 43 per cent, the installation was approved. We hope to complete this work in time to get some good from it this winter.

Problem Most Acute in Terminals

By A. B. Hillman
Engineer, Maintenance of Way, Chicago & Western Indiana—Belt Railway of Chicago

OUR problem boiled down to that of labor supply. A comparison of the labor situation late in the year with that which existed last April on the two roads I am associated with, showed the following: Track labor (laborers only) on the Belt Railway last April was 65 per cent of a normal force—at the end of the year it was 63 per cent. Track labor on the Chicago & Western Indiana last April was 48 per cent of a normal force—in December it was 42 per cent. Bridge and building forces on the Belt Railway last April were 85 per cent of normal—at the end of the year they were 80 per cent. Bridge and building forces on the Chicago & Western Indiana last April were 70 per cent of normal—in December 51 per cent.

In the track departments of both roads we were fortunate in that we lost no foremen. While some foremen had no gangs, they still kept a sharp lookout for any unsafe condition which developed.

Longer Hours

We have been working our forces longer hours, putting in as much overtime as the men are willing to work. On the Belt we have always done considerable work on industry tracks at the expense of the industries and during 1942 we expended about 8,000 hours on that type of work. Last year, all of our industries were informed that it would be necessary for them to contract such work, and as a result, only 1,247 hours were worked on industry tracks.

Problems the Same— But More Ingenuity Required

By J. E. Fanning
Assistant to Chief Engineer, Illinois Central, Chicago

NEITHER the work done last season nor the manner in which it was carried out, differed materially from previous years except in scope and in the fact that more ingenuity on the part of supervising officers was required to overcome obstacles incident to prevailing wartime conditions. Chief among these obstacles was the shortage of both skilled and unskilled labor, which existed on all our lines to a greater or less degree. The Illinois Central was affected in the South by the high wages paid for agricultural work and further North by prevailing wage scales in war plants, while each division lost many valuable employees to the armed forces.

The labor difficulty has been overcome in part by the extensive use of labor-saving machinery, and much credit is due the railway supply industry for its co-operation in making these devices so efficient and their use so essential in the conduct of maintenance of way work. If it had not been for the steady development of better methods of doing track work and the use of this modern equipment, much greater difficulty would have been encountered in meeting the demand imposed by the present traffic.

Our program for last year provided for laying approximately 260 miles of 112-lb. and 20 miles of 131-lb. rail, practically all of which was laid. It was necessary to lay this rail in various locations many miles apart, with the unavoidable disadvantage of loading, transporting and unloading the rail-laying equipment and the use of different gangs. Fortunately, however, each division has a number of experienced foremen and key men to form the nucleus of efficient rail laying crews, and it was found that where conditions were comparable, uniformly good results were obtained.

Naturally, the density of traffic was a consideration last season, but in multiple-track territory, it was possible to divert the traffic; much was also accomplished on single track lines by setting back the schedules of local and dead freight trains and

running them in fleets to avoid frequent interruption to the work. The policy of building up rail ends and flame straightening angle bars to lengthen the life of rail was continued.

Approximately 1,890,000 crossties and 1150 sets of switch ties were applied. To lengthen the life of these ties, a larger tie plate was adopted.

In the first nine months, 987,000 cu. yd. of ballast were placed on a program of 1,055,000 cu. yd., which was divided as follows:

Slag	415,000 cu. yd.
Rock	272,000 cu. yd.
Chat	124,000 cu. yd.
Washed Gravel	176,000 cu. yd.

Center dump and hopper cars were used in distributing this ballast, which was applied by company forces. In addition to the installation of new ballast, splendid results were obtained from cleaning old ballast by the use of moles and a large ballast cleaner.

Much attention was given last year to the stabilization of weak spots in the roadbed by driving piling on embankments as well as by ditching and the installation of sub-surface drain tile. This was handled by contract and with company-owned machines.

A considerable amount of repairs to buildings was handled by contract because of inability to recruit the skilled men necessary to complete the program, which included heavy repairs to depots, shops, engine houses and roadway buildings. It was necessary to estimate the requirements for building materials several months ahead in order to secure allotments from the War Production Board. At first, this was rather difficult but it can now be done with considerable accuracy and by working closely with the purchasing department, we obtained good results in keeping inventories to a minimum. As a result, the materials allotted were generally sufficient to meet the requirements, with the exception of new rail, wire and certain other critical materials.

Additional Facilities

The increase in traffic made it necessary to provide additional facilities at terminals and on certain lines—such as engine inspection pits, wash, locker and toilet facilities, longer passing tracks, etc. All of these improvements required manpower and reduced the force available for ordinary repairs.

Another condition affecting maintenance of way work was the shortage of cars for transporting materials. While this was unavoidable, nevertheless the delay and extra labor required in rehandling materials were among the difficulties encountered.

Only Three Essentials

By J. F. Swenson
Division Engineer,
Pennsylvania, Chicago

RAILWAY maintenance is simple; only three things, money, materials and labor are essential. Labor is now our real problem and the three preceding addresses have summarized this problem thoroughly. In addition, labor is now hitting us at new angles. For illustration, the new and inexperienced men in train service are responsible for more train accidents, which result in track damage.

Our program last year was unusually heavy because of the abnormal traffic we were required to carry. Added to that, new, larger and heavier locomotives required a lot of maintenance work, such as track changes at many points, the modification of engine house layouts and bridge strengthening for the heavier power.

We must give more serious thought to co-operation within our individual railway organizations. Only through this co-operation were we able to handle the traffic that we did during the last two years. We must start now to extend this co-operation. When one railroad has a serious mishap, it should be able to call on a neighbor for help. However, when all of the railroads are struck simultaneously, as in a heavy snowstorm, that's a different problem. We have all read of the Army and Navy sending men out to harvest potatoes; perhaps we will have to call on them too.

We are losing men every day. Many of these men are looking for softer jobs and more money during the winter. There is nothing we can do about it. We can't increase our wages. We must help each other. We can't call on some outside agency.

Electric Pumping Will Save Critical Materials

(Continued from page 132)

that are needed so badly for the transportation of fuel for civilian and war needs. It is estimated that the average amount of coal required to pump a thousand gallons of water with steam at a typical railway water station is from 25 to 30 lb., depending upon the efficiency of the plant, the grade and quality of the coal and the magnitude of the standby losses. Approximately one pound of oil is consumed in doing the same work, if the pump is operated by an oil engine. Therefore, where 2,000,000 gal. are pumped daily, 6,000 lb., or three tons, of coal are burned daily, and 22 cars of coal will be required annually. Where oil is used, 200 lb. will be required daily or 73,000 lb. per year, which is equivalent to almost 10,000 gal. or an 8,000-gal. tank car every 10 months. Where an electric pump replaces an air lift in a deep well, the saving in fuel is still greater; because of the lower efficiency of air-lift pumping, the consumption of fuel may be more than double that of steam or oil where the ordinary type of pump is employed.

If the 3,600 electrically-operated pumping stations now in service are each pumping an average of 100,000 gal. of water per day, the daily requirements are 43 coal cars, assuming that three days are required for loading and transit and one day for unloading. Against this, 172 cars would be required to haul the coal for an equal number of steam pumping stations. While it is true that fuel is required for the operation of central power plants, except for a relatively few hydro-electric generating stations, it is only a fraction of the amount burned in the smaller and less efficient railway pumping plants. Furthermore, the distance coal is hauled from the mine to the central power plant is less than to the railway pumping stations and the unloading of the cars is much simpler, requiring less labor.

Unfortunately, exact figures are not obtainable for the saving in fuel, material and man-hours, that are made possible by electric pumping, for which reason all of the foregoing figures relating to these savings are based on estimates. On the other hand, the estimates are conservative. Despite this handicap, however, taking into consideration possible errors that may have crept into the figures, it is apparent that the use of electricity in pumping will make worthwhile savings and that it can be made an important aid in the war effort.

Twenty Miles of Test Track on the Illinois Central

(Continued from page 123)

mately six inches on new slag ballast. The next nine miles were put up on about six inches of crushed stone ballast. The most southerly mile in the test section will be maintained for the time being on chats.

From M.P. 35 to M.P. 40, the first raise was made on the old stone ballast. On Miles 41 and 42, all ballast was removed from between the ties to the bottoms of the ties and the entire raise was made on new slag. The first raise was made on the old ballast from M.P. 42 to M.P. 49, and then again all old ballast was removed from the cribs and the entire raise on Miles 50 and 51 was made on new stone ballast. From M.P. 51 to M.P. 54, the track was raised first on existing stone ballast. A minimum running surface was made on the chat ballast on Mile 55, Kankakee Yard.

We are dressing the ballast section in two ways. One, called the full, or heavy, section, leaves the ballast around the tie ends, dressed off only two inches below the tops of the ties, while the other, referred to as the light section, leaves no ballast at the tie ends, to the bottoms of the ties, for better drainage. The manner of dressing on each mile is as follows:

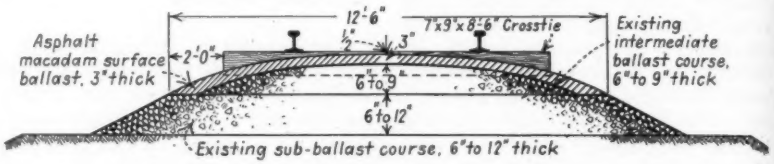
M.P. 35 to M.P. 36—Light section slag
M.P. 36 to M.P. 38—Heavy, full section of slag
M.P. 38 to M.P. 45—Light section of slag
M.P. 45 to M.P. 48—Light section of stone
M.P. 48 to M.P. 50—Heavy, full section of stone
M.P. 50 to M.P. 54—Light section of stone
M.P. 54 to M.P. 55—Chat

Asphalted Ballast

The New York Central made an installation of asphalt-impregnated ballast in 1939 to overcome especially bad drainage and subgrade conditions on one of its high-speed tracks at Bryan, Ohio. This installation extended below the bottoms of the ties.

Subsequently, W. R. Macatee of the Asphalt Institute, Washington, D. C., conceived the idea of providing a comparatively thin coating of asphalt over ordinary ballast to serve as a "roof" to drain water off the ballast section and to prevent fouling of the ballast by the infiltration of soil blown in from plowed fields, coal dust and cinders from passing trains, and limestone dust from ground-up pieces of crushed stone ballast. The theory behind this "roof" arrangement is that the ballast under the ties, if kept dry, will have a higher co-efficient of friction against being dislodged laterally into the space between ties, and that the binding together of the top surface of the ballast will tend to provide additional restraint against similar movement of the ballast, thus extending the time between necessary out-of-face repairs and renewals and the cleaning of the ballast.

Authority was obtained to install a half mile of this self-draining, non-fouling asphalt macadam surface ballast and the south half of Mile 46 was selected for the installation. The expense of this experiment was distributed among the Texas Company, the Association of American Railroads, the Lehigh Stone Company and the Illinois Central.



Cross Section of Asphalted Ballast Installation.

This type of asphalted ballast installation was something entirely new to the asphalt producers and the railway forces. Accordingly, the work had to be planned as well as possible, based upon what could be anticipated. It was to be expected that in the course of the work—and in particular this pioneering work — improved methods would be developed, which was the case.

Difficulty was experienced in getting the work under way, largely because the material in the tank car was not hot enough to be pumped. September 7, and the following three days, while the work was under way, were unusually cold for that time of year, the temperature ranging between 45 and 70 deg., with a strong wind blowing from the southwest. In order to pump the asphalt, it was necessary to heat it to between 275 and 350 deg. F.

The stone ballast was sprayed with the hot asphalt at the rate of two to three gallons per square yard. The ballast was dry and the asphalt penetrated approximately three inches below the surface. Immediately following the application of the asphalt, stone screenings, passing a ¾-in screen and retained on a Number 4 mesh screen, were spread lightly over the asphalt and tamped into the interstices, employing iron asphalt tampers for this purpose. A second or sealer coat of hot asphalt was then applied and promptly covered with a thin layer of fine stone aggregate, while the asphalt was hot. This sealer coat consisted of approximately four-tenths of a gallon of asphalt per square yard. The cover-coat aggregate was broomed by hand to effect uniform distribution.

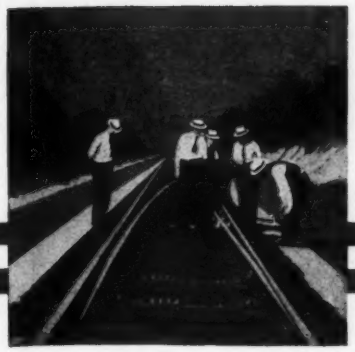
The asphalt was pumped from a railroad tank car, under steam heat from the locomotive hauling the car, to an automobile truck pressure distributor carried on an adjoining flat car. The work was begun by using a single hand-held hose with a spray attachment to apply the asphalt. This was changed to a spray-bar attachment of the type used in building bituminous macadam highways, which speeded up the work. The small stone and screenings were shoveled out of a gondola-type coal car pulled along by means of a cable attached to the flat car carrying the distributor truck. Wood guards were moved along on top of the rails between the flat car and the stone and screenings car as the work progressed, to keep the top of the rail free of asphalt.

The strip of ballast so treated in this test is 12½ ft. wide, extending 2 ft. beyond the ends of the 8½-ft. crossties. A total of 7,200 gal. of asphalt was used in approximately 2,480 track feet of ballast section. The work was completed on September 10.

Observing some movement in this asphalt "roof" under traffic, the spikes were "cracked" about ¼ in. on the south half of the installation to allow for the wave motion of the rail.

Labor shortages slowed up the progress of the work on all of the test installations. The use of a power cribbing machine, a power ballaster, and several electric tamping machines, following a fully mechanized rail laying gang, was effective in carrying out the heavier phases of the work.

The tests described in this paper were installed and will be carried forward under the direction of C. H. Mottier, chief engineer of the Illinois Central. G. M. Magee, research engineer for the AAR, is interested in the rail expansion, bolt tension, tie plate penetration, joint lubrication, rail anchor application and asphalted ballast tests, and is co-operating with the Illinois Central in preparing the tests and in compiling the test records.



What's the ANSWER?

Caring for Winter-Laid Rail

What special attention should be given during the winter to rail that has been laid early in the winter? During the spring?

Avoid Bending

By George M. O'Rourke
Assistant Engineer Maintenance of Way, Illinois Central, Chicago

New rail that has been laid early in the winter should be given a general smoothing as quickly as possible after it has been laid, to protect it against possible damage from uneven bearing resulting from frost, and to allow trains to operate over it at normal speed. Special attention should be given to line, which, obviously, cannot be maintained without perfect cross level.

While rail cannot be bent until the elastic limit of the metal has been exceeded, and considerable deflection will take place before it takes a permanent set, rail will bend under heavy wheel loads moving at present-day speeds of it is neglected too long. For these reasons, if enough labor is available, all swinging ties should be tamped up against the new rail before the close of work each day.

If consistent, rail laid early in the winter should be placed at selected points where the ballast is of adequate quality and sufficient depth to support it, on a stable and well-drained roadbed. For example, rail laid on chat ballast can be protected quickly by raising swinging ties and ties in low places with chat ballast placed under the ties from the ends with tamping trowels or paddles, thus permitting speed restrictions to be raised. On the other hand, new rail laid on muddy ballast, of types that must be tamped with hand picks or tamping tools, may require speed restrictions for a long time to insure that the rail will not be damaged.

The importance of reconditioning the ballast and roadbed concurrently with the installation of new rail is recognized generally. Usually, tie renewals and surfacing should follow rail renewals immediately. For this reason, many maintenance men are reluctant to lay rail early in the winter. Where the ballast is frozen, shims may be used to keep the rail in surface, but they must be removed as soon as the weather permits. Furthermore, the crossties should be reasonably good, correctly spaced and adequate in number to support the new rail. If there are many poor ties or wide spaces between good ties, the new rail may suffer untold damage. These are conditions that cannot be corrected while the ballast is frozen.

Be Fully Prepared

By District Engineer

Preparation for rail that is to be laid in winter is fully as important as the attention that the rail should receive after it is laid. Rail should not be laid in track that is not in good surface and line; the importance of bringing the track to good surface and line before laying rail in the winter cannot be emphasized too strongly. For this reason, where rail is to be laid in the winter, the track should be prepared to receive it in the fall, to insure against damage after it has been installed.

Track that is to receive new rail during the winter should be surfaced and lined carefully late in the fall.

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In April

1. *To reduce wear and avoid damage to the rail and fastenings, what sequence should be followed when applying joint bars to new rail? To old rail? Why?*

2. *To what extent is it feasible to contract building maintenance in these days of labor shortages? What are the advantages? The disadvantages?*

3. *Are fixed camps of benefit at this time in obtaining or holding labor? Why? What facilities should be provided? Who should look after them?*

4. *Considering the present volume of traffic and the shortage of labor, should modifications in the normal bridge program be made in 1944? What? How? Why?*

5. *What are the advantages of sub-ballast? The disadvantages? What materials are most satisfactory? To what depth should it be placed? Does the character of the subgrade make any difference? Of the top ballast? Why?*

6. *In what ways can water-service maintainers conserve critical materials without lowering the dependability of water stations?*

7. *When installing ties, what precautions can be taken that will increase their service life? What is the importance of each?*

8. *What rules should be observed in locating fire extinguishers? Why? Should the locations be specially marked? If so, how? Who should be responsible?*

This does not call for a general raise, but for sufficient spot surfacing to insure uniform support for the new rail. Furthermore, the tie condition should be such as will not leave the rail without support. Any ties that will not provide sufficient support for the rail should be replaced sufficiently early in the season to insure that they will become well bedded before winter. Replacing ties at the last minute results in rough track in winter.

With this preparation, rail that is laid carefully will require minimum attention during the winter, for there should be no swinging ties to tighten, a task that is almost impossible after the track is frozen. Obviously, some irregularities will develop by reason of adzing, but this can be overcome through the judicious use of shims. If other irregularities of surface develop during the winter, shimming provides the best remedy. If the rail is laid to good line, there is little likelihood that line will give trouble unless the track heaves, in which event the same action should be taken as with any other track.

As the frost goes out in the spring, the rail should be watched carefully to insure that no irregularities develop that will cause surface bending, for surface-bent rail always remains surface-bent rail. As soon as the ground has settled, the new rail should be given a general surface, at which time tie renewals should be made.

What to Do When Ice Jams

Where heavy ice jams at a bridge, what measures can be taken to break the jam? If the ice is ground up? What precautions must be observed?

Dynamite Essential

By J. S. Hancock
Bridge Engineer; Detroit, Toledo & Ironton; Dearborn, Mich.

In many cases, ice jams can be broken by using clamshell buckets operated from cranes. Dropping the bucket onto the ice is often effective in breaking up the jam, while it can also be used to lift out ice and the heavy drift which often accompanies a flow of ice. A drop hammer is also often effective.

Pike poles should be readily available for every section and bridge gang in territory where jams are known to form. Through their use, jams can often be prevented from forming, particularly at timber trestles, and they might be the only means available for saving the structure. In most instances, they are the first line of defense, and the sole means of protecting the structure until more effective equipment arrives.

Dynamite is used universally for preventing and breaking up ice jams. When used close to the structure, the charges must of necessity be light. However, the tendency is to use charges that are too light rather than too heavy, as the force of the explosive is usually somewhat exaggerated, especially by those inexperienced in its use. Often the shifting of the ice and the movement of the water resulting from the explosion will start the jam moving without actually breaking up the ice. Gelatin dynamite, 30 to 40 per cent in grade, has sufficient strength to break up ice, and is heavy enough to sink readily in water.

It is preferable to fire the dynamite electrically, as this permits several charges to be fired simultaneously, the combined force of which will be more effective in breaking up the ice than if they are fired separately. However, to break up large cakes or to break small jams, a charge may be placed at or thrown to the desired place and exploded by a fuse and blasting cap. Care must be taken to insure that the dynamite is thawed completely before using, and that it is not allowed to remain too long in the cold water. For this reason, low-freezing dynamite should be used. When used in water, the hole where the cap enters must be sealed with heavy grease or other waterproofing medium.

Serious ice jams occur regularly at certain bridges where the streams are shallow or sluggish, permitting them to freeze solid during a severe winter. Where this condition exists, the ice does not thaw quickly enough to be dislodged, with the result that when the ice from above moves out, it rushes down and piles up on the solid ice. Once a jam has formed at such a point, it is difficult to break. In a large stream, the ice will continue to accumulate until the tremendous force of the water backed up by the jam, usually aided by warm weather, causes the jam to break with explosive force, endangering everything in its path.

Ice jams can sometimes be prevented by starting downstream, well below the probable location of the jam, to blast out and honeycomb the ice below and above the danger point before the spring thaw comes, so that when the upper ice moves out it will move through without jamming. Holes for blasting should be spaced approximately 30 ft. across the stream and the rows should be at intervals of 50 to 80 ft. Large ice fields can also be broken up in the same way.

A rough approximation of the amount of dynamite required for each charge is three times as many 1¼-in. by 8-in. cartridges as the thickness of the ice in feet, placed below the ice 1/12 of the distance between the holes in the row. However, it is recommended that a preliminary row or rows of holes be fired, to determine more accurately the correct charge and depth, the best spacing of the holes and the number of holes to fire simultaneously.

If the ice is jammed between bridge piers, the charges should be placed on the ice midway between the piers and all charges should be fired simultaneously. Where a large gorge forms upstream that endangers the safety of a structure, and the ice is packed deeply, possibly to the bottom of the stream, about the only thing than can be done is to bomb it from an airplane, for such gorges are usually too dangerous or too inaccessible to combat otherwise.

An Individual Problem

By A. L. McCloy
Supervisor of Bridges and Buildings, Pere Marquette, Saginaw, Mich.

Every bridge presents an individual problem in respect to an ice jam. In some cases, the jams can be cleared by using a crane to drop a heavy weight on the ice and break it into smaller pieces that will flow through the bridge opening. Explosives cannot be used in such cases because of the danger of the moving ice carrying the charges under the bridge and damaging it.

In other cases, ice jams can be broken by dropping explosives between the ice cakes. We have had considerable experience with this method, as we have ice trouble every spring on one of our branch lines. We are now working on a project to raise the track and a steel span 24 in., and install a new through girder span, for the purpose of eliminating the necessity for breaking an ice jam every spring.

It is a good plan to provide ice protection in front of each pier in streams where ice trouble occurs, such as a V-shaped nose or shearwater, to force the ice to either side of the pier. On pile trestles, we place long bridge stringers at each bent, inclined at an

angle of 45 deg. with the horizontal, and extending upstream from the cap, with an old rail spiked to the upper face. As the ice cakes reach the structure, they slide up on these rails and break up, and the pieces pass on through the opening.

Must Be Prepared

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Ice jams rarely come unexpectedly, for which reason ample preparation should be made to deal with them. If possible, the ice should be broken up before it reaches the bridge, and passed down the channel to avoid a jam. If acres of massive cakes are involved, they may be broken up by the judicious use of explosives. There are cases, however, where jams form below bridges and back up through the structures.

When such a jam occurs, the bridge should be loaded down with heavily-loaded cars and, if the situation is sufficiently serious, an expert in the handling of explosives should be employed to loosen the sea of ice when it first begins to move. The explosives should be set off by batteries both above and below the bridge, the lower charges first, and then, as the ice begins to move, those above the bridge follow. If the explosives are placed properly, there is no danger of damage to the bridge, unless too heavy a charge is fired.

If the lower ice moves away and the ice is still jammed under the bridge, quick action is necessary, for the pressure may push the foundations from under the bridge. In this case, charges of sufficient magnitude should be placed at intervals entirely across the channel and fired simultaneously.

Where ice, whether ground up or in cakes, has piled up above a bridge until it is higher than the bridge, it may be necessary to blast channels around the high ice to let the water through, or to bomb the mountain of ice if it shows signs of moving.

Keeping Camp Cars in Condition

What measures should be taken to keep camp cars for floating gangs in good condition? Permanent labor camps? What effect will this have on attracting and holding men? Why?

Must Be Supervised

By F. H. McKenney
District Engineer Maintenance of Way, Chicago, Burlington & Quincy, Omaha, Neb.

To keep camp cars in good condition, it is first necessary to employ a camp man under the supervision of the commissary man, to keep the cars cleaned and swept and, when necessary, to keep up fires, so that the cars will be warm when the men come in from work wet and cold. This man usually cares for all the cars and carries all fuel and water, unless the camp is larger than ordinary. With the large turnover which we are now experiencing in our maintenance gangs, it is almost impossible to keep bugs out of the cars unless they are sprayed frequently with suitable chemicals. When a car becomes badly infested, it may be necessary to take it out of service and fumigate it thoroughly to eliminate the bugs and other vermin. Many of the older cars were lined with lumber that has shrunk, and the resulting cracks provide excellent hiding spaces for bugs. Plywood makes an attractive lining for cars, and cars so constructed are more easily cleaned, while there is little opportunity for bugs to find a place to live.

Painting the inside of the cars annually by spraying paint that has been well thinned with turpentine tends to eliminate bugs. As soon as the cars are laid up at the end of the season, they should be repaired and reconditioned for use the following year. Inspections should be made by the gang foreman at regular intervals throughout the season to insure that the cars are kept in good condition and that necessary repairs are made to doors, windows and screens. Stoves and smoke jacks should be watched to insure that they do not become fire hazards.

We maintain no permanent labor camps, other than a few car bodies set off locally to house permanent labor and these present few difficulties, for the permanent residents do not require as much maintenance on their buildings as transient employees do. Periodic repairs usually suffice for this type of housing. There is no question but that clean, well-maintained camp equipment attracts a better class of labor, when it is available. At present, however, there is no choice of track labor in the regular markets for floating labor, so that the benefits are not so apparent as they would be normally.

Must Be Made Even Better

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

This subject is worthy of the most serious consideration, for clean and satisfactory housing is one of the important factors in both attracting and holding men. However, the quality and quantity of food served, as well as its cost, are equally important and cannot be divorced wholly from the housing in considering the operation of a labor camp. Clean, warm, well-lighted cars, with some provision for recreation, and good food, will do more to attract and hold men than an increase in pay.

As a rule, when a foreman is put in charge of a camp, he is instructed to keep the cars clean and is told how to do it. But the matter should go further than mere instruction, for constant supervision is needed. Division and system maintenance of way officers who pass a camp should make it their business to inspect the cars and make sure that they are being kept in satisfactory condition. Every camp should have a man who is charged with the duty of cleaning the cars daily, airing them out by opening doors and windows, making the beds, keeping the cars supplied with water, and keeping the fires going in cool and wet weather, so that the men can warm and dry themselves when they come in at the end of the day. This is another factor that will help hold men. Dirty cars, lack of wash water, and late meals tend to breed dissatisfaction, and men are likely to leave at the first opportunity.

When cars are cleaned and cared for as they should be during the day, the foreman should give the men to understand that they must do their part toward keeping them clean while they are occupying them. In most cases, the men will respect such requirements and co-operate with the camp management. If possible, the camp should have a shower car, a facility that the men greatly appreciate. Some objection to installing shower baths may be raised on the ground of cost, but some roads that have already made such installations find that they are effective in keeping the men satisfied. One cannot make progress without incurring some cost.

We have already learned some

things as a result of the present labor stringency. In the postwar era we may find it necessary to do things that had not occurred to us in normal times. Improvement in housing conditions is one of the items to which we must give more consideration in the future, if we expect to keep our gangs filled.

How to Hold Men

What practical means can be employed to hold bridge and building men in the face of constant industrial demands for skilled labor?

Older Men Stay

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

It is the younger and more adventurous men, rather than the older and more settled men, who are attracted by big industrial wages. In general, the younger men have not acquired much seniority, while the older men not only have gained seniority but also a prescriptive right to a pension which will be lost if they break their term of service. For this reason, the temporarily higher wages in war industries are not so attractive to the older men as they are to the younger ones, and few of them are leaving the service.

The real effort to hold men must be expended on the group between such new employees as we are able to get and the older men. This involves working bridge and building men overtime, when this is agreeable, to give them a larger total wage, as well as to accomplish more of the work that is so badly needed; obtaining deferments from military service; upgrading deserving and likely men; making arrangements for week-end visits home, when this can be done; improving camp conditions; and transporting the men to and from work, when this can be done consistently. The extra effort to do these things will pay dividends in more stable and better satisfied forces.

To obtain desirable prospects, it is necessary that an intensive campaign of solicitation be carried on, including advertising in local and rural papers; that experienced employment agents keep in touch with government employment service and agencies; and that the employees themselves be encouraged to solicit workers among their relatives, their friends and their acquaintances.

New employees must be made to know that their work is important. The foreman must take an interest in them and see to it that the likely ones are given every practicable chance to prove their worth. In every gang there will probably be at least one experienced older employee who is adept at training men. If not, steps should be taken to have someone show the new men how to perform their tasks and assume their duties. Usually an oldster who has been successful in making good citizens out of his children will have the knack of getting the best efforts from the newer men, especially in the training and holding of high-school boys, part-time employees and women.

Treat Them Fairly

By A. E. Bechtelheimer
Bridge Engineer, Chicago & North Western, Chicago

At present, the bridge and building forces are greatly depleted. Many of the younger men have been inducted into the armed forces or have migrated to war industries, with the result that the men who are older in both age and length of service are now carrying the load that is normally borne in part by the younger men. Many of the new men whom we are able to employ are over age; that is, they are older than would be accepted in normal times. In recent months some men have entered railway service upon the completion of industrial construction projects, but most of the younger men who enter the service in this way cannot be held unless deferment is obtained for them. Again, some of them apparently accept employment merely as a stop gap, until work can be obtained in some war industry, especially if the railway employment is not so located that they can live at home.

For the present, then, most of the bridge and building work will have to be done by men who have grown up in the service and have established valuable seniority rights. Railway work has a fascination for these men who have followed it until it has become a part of their existence. To hold them, it is necessary only to give sympathetic attention to any complaints they may have relating to working conditions, and fair consideration to their demands for wage adjustments to meet increased living costs. These men are valuable to the railroad because they are familiar with their work and with railway practices by reason of their many years of service.

Can Glass Blocks Be Used?

To what extent can glass blocks be substituted for critical materials in building construction and maintenance? For what purposes? What are the advantages? Disadvantages?

Are Used Extensively

By A. T. Hawk
Engineer Architect, Chicago, Rock Island & Pacific, Chicago

Glass blocks are being used extensively at present to replace corroded steel sash, as well as wood sash and frames that require renewal. They are also being installed where additional light is desired. Both steel and wood are now critical, and glass blocks will go a long way toward filling the need for window openings when the critical materials cannot be obtained. As a rule, steel sash in railway buildings are not kept painted as they should be and wood cash is equally neglected. Satisfactory lumber is no longer available for sash and frames. The day of clear white pine is gone and there seems to be no substitute of comparable quality with respect either to ease of working or to service life.

The use of glass blocks for window openings in shops and enginehouses is growing, for they seem to meet all requirements for light, while they reduce maintenance materially, with respect to both effort and cost. They are also easier to keep clean than the conventional glazed sash, and they have a higher insulating value. They also reduce outside noises and do not allow atmospheric dust to filter through. For certain rooms, as in laboratories, glass blocks tend to keep the temperature

more nearly constant. The heat conductivity factor for glass blocks is 0.49, compared with 1.13 for ordinary windows, so that they are nearly 2½ times as effective as windows in resisting heat transmission. For this reason they reduce the amount of surface condensation of moisture during cold weather. The only disadvantages of which I know are their somewhat higher price and the fact that some moveable sash must be provided for ventilation if buildings are not air-conditioned.

Are Satisfactory

By General Inspector of Buildings

Our experience with glass blocks as a substitute for conventional windows having steel or wood sash indicates that they are entirely satisfactory for certain classes of buildings, but I doubt whether they will ever displace sash entirely. Certainly they cannot be used where a clear view is demanded, as in signal towers and telegraph offices. However, I understand that one of the new plastics has been developed which has a much higher degree of transparency than glass, and it may be that this will be found to be useful when a clear view is demanded. In fact, it is said to be more than thirty times as transparent as glass.

I have also noticed that glass blocks are being used in waiting-room windows in some of the modernized stations, but we have not yet made this application. I see no reason why they should not be satisfactory for this purpose, if they are used judiciously to obtain the desired architectural effect.

Both steel and lumber are still highly critical, with every prospect that they will remain in this category as long as the war lasts. For this reason, we are reaching the point where we must take some action to find a substitute for both wood and steel sash that are failing and which cannot be replaced in kind. We have used glass blocks in an experimental way for large window openings in shops and have also experimented with a few windows in enginehouses.

Out of these tests we have concluded that the glass blocks are suitable for these larger openings, and I am hopeful that we will extend their use considerably in the next few years, as the present sash fail. One of the advantages of the glass blocks, compared with wood sash, is that the frames can be discarded and the entire opening filled solidly. The constant puttying and reputtying, painting and repainting that must be done to keep sash in good condition, will be eliminated. So far, we have had no breakage, compared with the almost constant replacement of window glass. Heat losses through the glass blocks are far lower than through ordinary window glass, so that they tend to conserve fuel. Glass blocks greatly reduce maintenance, and can be kept clean more easily around shops, enginehouses and power plants, than ordinary windows.

There are certain disadvantages, although some are of minor importance. Where a window opening that has previously provided ventilation is filled solidly, some other means of providing ventilation must be found. In some cases, this can be done by means of small openings, with swinging sash placed in the glass-block assembly. Another disadvantage is that in case of breakage, replacements are more difficult than in conventional windows. Again, some of the glass blocks on the market do not adhere well to cement mortar and thus fail to maintain a bond after they are installed. This is being overcome by some manufacturers, but should always be looked into when selecting the required blocks.

How Many Jacks?

When raising track out of face, how many jacks should be used? Why? Will this reduce or increase the probability of delays to trains? Does the height of the lift or the density of traffic make any difference?

Should Be Limited

By E. E. Crowley
Roadmaster, Delaware & Hudson, Albany, N. Y.

When raising track out of face, the number of jacks to be used will depend on the height of the raise and the size of the gang. When the raise is 2 to 4 in., two jacks should keep ahead of a gang of 50 men. If the raise is 4 to 8 in., four jacks can be used to advantage, and in some cases six jacks will be better. The purpose of the extra jacks is to take the strain off the rear or surfacing jacks, loosen the track ahead and make it easier on the men operating the jacks.

Some trackmen believe that by using additional jacks it is not necessary to tamp joint ties, as required where only two jacks are used. I see no merit in this argument, for the men who must carry the extra jacks can be employed in tamping the joint ties. Others believe that when only two jacks are employed, sags may be left in the track, but if the joint ties are tamped as they should be, and the foreman or assistant foreman in charge of the raising of the track checks his board after the jacks have been removed, there will be no reason for low joints or centers. In most cases, it will be found necessary to knock down with a sledge ties that have been tamped to hold the raise, since there is more likelihood of over rather than of under-raising.

In general, the number of jacks should be limited to that necessary to keep ahead of the tamping rate of the gang. At no time should jackmen have more than two or three rails raised in advance of the tampers, to insure against delay when making runoffs for trains.

Lift Not Material

By T. M. Pittman
Division Engineer, Illinois Central, Memphis, Tenn.

When raising track out of face, it is desirable to use enough jacks to keep the men who are renewing ties and raising track out of the way of the tampers. Unless this is done, the operation will soon become badly snarled. The number of jacks required to accomplish this depends on the number of men in the gang and the number of ties to be renewed.

Prior to the introduction of power tie tampers, the progress of out-of-face surfacing was slow and four jacks were generally used. Since power tampers have come into use, however, the operation has been speeded up to the point where from eight to ten jacks are required. Generally speaking, an increase in the number of tampers will require an increase in the number of jacks. Neither the height of the lift nor the density of traffic is material, for there is little difference in the time required to make a runoff where six jacks are used, compared with ten. Since this is true, there will be no additional delay to trains.

There is a difference of opinion among trackmen as to how many jacks should be used, but the progressive ones seem to be leaning

toward a larger number, as this not only facilitates the work, but enables them to produce a smoother surface. For the average surfacing gang, eight to ten jacks will give very satisfactory results.

Four Jacks Enough

By Anton Kallas
Section Foreman, Chicago & North Western, Dixon, Ill.

Four jacks should be used when raising track out of face. The forward jacks help to break the ballast and loosen the track, while the back jacks hold the surfacing in place, and thus reduce the probability of delays to trains. If only two jacks are used, more time is required to make the runoff. With high lifts and dense traffic, four jacks, therefore, reduce the probability of delays to trains and incidentally the number of jacks, should be kept within such limits as will insure that an approaching train will not be required to stop while emergency measures are being taken to get the track in shape for its passage. Obviously, taking two bites instead of one will slow down the rate of progress that can be made, but no matter how important it may be to complete a job in minimum time, safety is still more important. It is also important that there be no delay to troop trains or other trains carrying military equipment and supplies or even, in view of the extreme shortage of cars, those handling civilian goods.

A Moot Question

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

This is a question upon which there is not entire agreement among trackmen, some favoring a few jacks while others prefer more. However, some of the methods formerly in vogue are undergoing modification because of the conditions under which work must be done today. Never in the recollection of men now in the service have they been less able to rely on regular train schedules in planning their work, for many of them are not running on time and there are an unusual number of extra trains. In addition, many of the regular trains are being operated in two or more sections, and all trains are moving at higher speeds than formerly. Special trains carrying soldiers and military equipment are common, and few excuses are accepted for delays to trains of any character.

Under these conditions, and in view of the character of the labor now available to us, it is not always wise to make a high lift in one operation. Preferably, a heavy raise should be made in two or more stages, using as few jacks as consistent with the size of the gang, so that the tamping will always follow closely behind the jacks and long runoffs will not be necessary.

Prior to the war, a large percentage of our trackmen were experienced and familiar with surfacing requirements, tie renewals and the other items that go with ballast renewal. They could be relied on to work fast, safely and dependably, and one could use four to eight jacks with assurance that trains could be allowed to pass over the runoff and newly-surfaced track at reasonable speed without delay, almost regardless of the amount of the lift. Today the tendency is to increase the maximum rate of speed under slow orders, and in some cases slow orders are not allowed, so that the track must always be in condition for full speed. The laborers whom we are now able to employ cannot always be relied on, even with good supervision, to work as fast, as safely or as dependably as before.

It is for these reasons that the lift,

Conserving Pump Valves

What measures can be taken to prolong the life of rubber and composition pump valves?

Make Correct Selection

By C. R. Knowles
Superintendent Water Service (Retired) Illinois Central, Chicago

It is of first importance in obtaining maximum life from pump valves that the valve be selected that is best suited for the service it is to perform. Next in order, but of equal importance with the selection of the valve, is the condition of the seat and stem. The lift of the valve, the tension of the spring and the character of the suspended matter carried by the water, are also factors which affect the life of valves.

There are several grades of rubber pump valves, ranging from soft-rubber valves, which are suitable for cold water and relatively low pressures, to the vulcanized hard-rubber valves for hot water and high pressures. Soft-rubber valves are well adapted for use in ordinary tank service, when cold water is handled by the pumps and when the pressure does not exceed 50 lb., since they form a better seat under low pressure than hard-rubber valves will. Furthermore, they are less subject to wear when the water carries sand or grit.

On the other hand, soft-rubber valves are subject to disintegration and other damage under pressures higher than 50 lb. They also become worthless in a short time if used in hot-water service. It is not unusual to find soft-rubber valves pushed partly through the seat and ruined in a short time when they have been used in pumps handling hot water. This is likely to happen, especially if they are placed in pumps that are used in boiler-feed service or for washing boilers.

On the other hand, it is an equally serious mistake to use valves designed for hot-water service in a cold-water pump, because they will have the same effect as a metal valve, and will cause undue wear on both the valve and the valve seat, so that it will be difficult to form a tight seat. Medium hard-rubber valves should be used in high-pressure pumps, but they should always be provided with well-fitting valve plates, preferably of brass or bronze.

In this connection, it is advisable to use plates on all rubber or composition pump valves, because they prevent distortion of the valve and wear from the springs. Valve plates also make it practicable to use thinner valves, such as valves that have been resurfaced. Another advantage of valve plates is that when the seat face has become worn, the valve can be turned over and reused.

Stems should fit snugly the holes in the valves. If the fit is loose, the hole will wear, allowing the valve to leak or shift slightly, so that it seats improperly. The length of the valve stem and the tension of the springs should be so adjusted that the valve will have the correct lift. Either too much or too little lift of the valve will increase the rate of wear, for, with too much lift, in closing, the valve strikes the seat with unnecessary force, while if the lift is not sufficient the water way will be restricted and friction will develop be-

tween the valve and the valve seat.

Composition valves are usually reinforced with a fabric of some kind, and are tougher than rubber valves, but do not possess the same amount of resilience. The same care should be given valves of this type as is given rubber valves, for they are subject to the same forms of wear and damage. However, unlike the rubber valves, they cannot be refaced satisfactorily.

Supervision Needed

By Supervisor of Water Service

I have found that despite the fact that both water service repairmen and pumpers should be familiar with the types and grades of valves that are best suited for the individual pumps under their jurisdiction, close supervision is needed to insure that these valves will be used to best advantage in all cases. Both rubber and composition valves are designed for specific purposes, and if they are not used for these purposes, not only will the service and life obtained from them be unsatisfactory, but this misuse may be detrimental to the pump in which they are used, and the delivery of the water will be affected. While there are several grades of rubber valves, those used in railway water service are generally confined to soft, medium and hard rubber. The soft-rubber valves are designed for use in cold-water pumps working under heads up to 100 ft., which includes the great majority of those engaged in pumping water for locomotive boilers. Medium-rubber valves are used in cold-water pumps that work at somewhat higher pressure, and hard-rubber valves are for hot water service and high pressures. While medium-rubber valves are somewhat more resistant than soft rubber and will last longer, they are also unsatisfactory for either hot water or high-pressure pumping. Hard-rubber valves should be used for high pressure and for hot water. The largest use of this type of valve in water service is in boiler-feed and boiler-washing pumps in power plants and engine houses.

It will be seen, therefore, that the selection of the correct valve for the service becomes important in any effort to conserve valves by prolonging their life. The valve seat should be true, with no scoring or other irregularities. The valve spring should be adjusted to insure correct seating of the valve, and the stem should fit snugly but not tightly in the hole provided for that purpose. Care should be exercised to adjust the lift of the valve, for either too much or too little lift will damage the valve and shorten its life. A metal valve plate is desirable if best results are to be obtained from the valve, since it prevents wear by the spring or the valve stem which, if allowed to occur, will allow the valve to seat unevenly and thus wear quickly, so that a good fit cannot be maintained, with consequent back leakage and loss of pump efficiency.

What Parts Should Be Carried?

In view of the present difficulty in obtaining repair parts, to what extent should a stock of parts and other supplies for motor cars now be carried on hand? Who should carry them?

More Important Than Ever

By C. H. Ordas
Supervisor of Motor Cars, Chicago, Milwaukee, St. Paul & Pacific, Chicago

At present, it is more important than ever before to keep motor cars and other maintenanme-of-way equipment in the best possible operating condition. Obviously, this necessitates a larger use of repair parts if new equipment cannot be obtained. Because of the extreme labor shortage, every facility that will assist workmen to keep tracks and structures in the safest and most effective operating condition, should be provided and maintained to a high standard. Although certain limitations have been placed on the quantities of repair parts that our stores department may obtain and stock, we have experienced no serious delays so far in maintaining our power machines in the field or in getting them back in service when shopped for repairs.

All repair parts are stocked and issued from a central storeroom adjacent to our maintenance shop, in charge of a sectional storekeeper who is under the jurisdiction of and reports to the general storekeeper.

We have made in our shops some items that are not obtainable by purchase but which were needed to get machines back in service. Much use has been made of serviceable parts salvaged from worn out machines that are being retired and dismantled. Machine operators have been asked to assist by conserving repair parts and by not ordering complete assemblies, ordering instead only those parts that are actually worn out or broken. The failed part is turned back to the storeroom where it is then determined whether it can be repaired and reused. Our policy of holding to the minimum the number of models or types of cars and engines has resulted in greater interchangeability of parts and a reduction in the number of parts that must be kept in stock.

Must Anticipate Needs

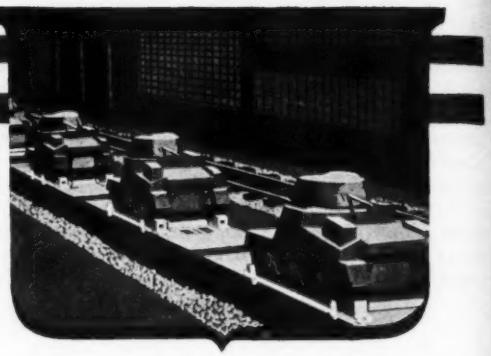
By C. R. Knowles
Superintendent Water Service (Retired) Illinois Central, Chicago

The principal difference between the present and normal times is that the stocking of motor-car repair parts and supplies must now be anticipated further in advance of the need for them. Normally, the needed parts are obtainable on short notice, but at present there is little assurance as to the time of delivery and in some cases, the parts cannot be obtained at all. It is advisable, therefore, to increase the stock of parts that are difficult to obtain, while the supply of those parts that are more readily obtainable may be kept at or near normal level.

Particular attention should be given to the reclamation and reconditioning of useable parts salvaged from scrapped motor cars. Many of the parts of cars that must be retired can be reclaimed with small cost and little effort. This should be done under the direct supervision of experienced motor-car mechanics who are thoroughly familiar with the various types of cars and their requirements. Under normal conditions, the expense of repairing and reconditioning most of the parts that can be salvaged in this manner, can rarely be justified. In view of the present difficulty of obtaining them, however, it is advisable to recondition parts that cannot be purchased, regardless of cost.

The centralization of motor-car parts at a limited number of storehouses is desirable at this time to insure that such parts as are on hand may be available for a wider distribution than is possible if they are scattered through a larger number of storehouses and repair shops. However, certain parts may be carried to advantage at division storehouses or at repair shops, but such stocks should be limited to immediate needs.

NEWS of the Month



Pullman Companies To Be Split

A victory was won by Pullman, Inc., in the monopoly case brought against it by the government when the District Court at Philadelphia, Pa., handed down an opinion late in January which permits Pullman, Inc., to decide whether to divorce its sleeping car service or its manufacturing business to satisfy the demands of the government. Although the government contended that the corporation should discontinue its manufacturing activities and retain its sleeping car business, the court, in its decision, declared that "the public interest requires complete separation of the two businesses, but does not require that the court make the choice for Pullman, Inc."

Eastman Seeks To Curb Black Market

Director Joseph B. Eastman of the Office of Defense Transportation last month asked the municipal governments of more than 100 of the country's principal cities to aid in stamping out the growing "black market" in railway and Pullman accommodations. The appeal was made to the mayors of the cities involved.

"During a period of scarcity," Mr. Eastman explained in the letter he addressed to the city officials, "it becomes financially profitable to secure reservations in order to resell them at a premium. Certain persons in a number of our large cities have been engaging in this practice and, in many cases, charging exorbitant fees over and above tariff price of the tickets, and have been thereby interfering with the orderly and equitable distribution of railroad reservations. An especially unfortunate aspect of this practice has been the additional difficulty which it has brought to persons traveling on essential war business."

General Gray Gets Legion of Merit Award

For "exceptionally meritorious conduct" while heading army railroad operations in North Africa, the Legion of Merit has been award to Brig.-Gen. Carl R. Gray, Jr., director general of military railways. The citation reads as follows:

"Exceptionally meritorious conduct in performance of outstanding services during the period of February 9, 1940 to October 1, 1943. As Director General of Military Railways, Brigadier General Gray has had the responsibility of the development and operation of all railways within the North African Theater of Operations. That this colossal task has been successfully accomplished in North Africa, Sicily, and lately in southern Italy, is a tribute to his tireless energy, keen judgment, and inspiring leadership. He has surmounted countless obstacles to effect the movement of tremendous quantities of supplies and equipment, and numbers of personnel, and thus has made a great contribution to the past successes of the troops he commands."

Transverse Fissures Found Cause of Wreck

A recent accident, involving two trains on the Atlantic Coast Line, in which 72 passengers were killed and 187 others were injured, was caused primarily by a broken rail which resulted from transverse fissures, according to findings of the Interstate Commerce Commission. The accident occurred near Rennert, N.C., on December 16, when three cars of a southbound passenger train were derailed and, fouling the northbound track, were struck a short time later by a northbound train.

Although the I.C.C. found that laxity in flagging northbound traffic on the part of the crew of the stalled train was responsible for the loss of life and injury, it also reported that the derailment occurred when a rail broke beneath the train at one of the three transverse fissures, none of which had progressed to the outer surface. Officials of the road reported that the section of track in question had been inspected from a motor car three days before the accident and also that a detector car had operated over the track in this vicinity two months prior to the date of the accident.

Recent Changes in W.P.B. Requirements

Railroad frogs and switches became Class B products, rather than controlled materials, on January 1, under the Controlled Materials Plan, the change being brought about by the War Production Board's Direction No. 40 to CMP Regulation No. 1. Under the new set-up, frogs and switches are now available to users on preference rated orders, rather than on authorized controlled materials orders.

In addition, as a means of speeding construction in bridge and building work and eliminating a part of the detail paper work involved therein, WPB has authorized the use of blanket applications in requesting authority for miscellaneous routine bridge and building construction over a six-months periods. Instructions read in part as follows:

"It is recognized that cost limits set forth in Conservation Order L-41 as applied to the railroad industry are too small to carry on necessary incidental construction exclusive of railroad tracks and operating facilities (now exempt from Order L-41). Therefore, to avoid the delay and paper work under present procedure of submitting individual applications for each job where the total cost for labor and material does not exceed $10,000, blanket applications may be submitted to the WPB, Washington, to do miscellaneous routine construction for small building and bridge work over a six-months period of time.

Railroads Short 111,000 Workers in December

Railroads of the nation were short a total of 111,000 workers on December 1, as compared with 117,000 needed on November 1, according to a statement issued by the Railroad Retirement Board. This estimate for the entire country is based on reports from 194 employers which indicated an existing need for 98,800 additional workers. The 5 per cent decrease noted is attributed to the effect of freezing weather on the volume of maintenance of way work which it is possible to do on the Northern railroads, the approaching end of the iron ore shipping season on the Great Lakes, the importation of Mexicans, and the release of agriculture and munition workers.

December 1 Personnel Needs of Railroads

(Including Only Railroads Which Reported in Both November and December)

Employee group	Needs reported: Number	Percent of total	Percent of Nov.
I Executive, official, and professional	230	0.2	108.5
II Clerical	1,927	2.0	93.6
III Maintenance of equipment and stores	28,493	29.2	97.3
IV Maintenance of way and structures	49,301	50.6	90.5
V Transportation	16,983	17.4	103.4
VI Miscellaneous	617	0.6	102.3
Total	97,551	100.00	94.6

Personal Mention

General

T. W. Fatherson, engineer on construction of the Tremont & Gulf, with headquarters at Winnfield, La., has been promoted to general superintendent with the same headquarters.

P. L. Koehler, division engineer on the Chesapeake & Ohio, with headquarters at Ashland, Ky., has been promoted to trainmaster of the Coal River subdivision, with headquarters at St. Albans, W. Va., succeeding **K. R. Ketcham,** who has been transferred to Thurmond, W. Va.

Ernest B. Moorhouse, assistant engineer on the Grand Central Terminal of the New York Central, with headquarters at New York, has been promoted to assistant manager of the Grand Central Terminal, with the same headquarters, succeeding **Francis Boardman,** whose death on December 12 was reported in the January issue of *Railway Engineering and Maintenance.*

Berlin V. Bodie, trainmaster of the Eastern division of the Alton, with headquarters at Bloomington, Ill., and an engineer by training and experience, has been promoted to superintendent of the Eastern division, with the same headquarters. Mr. Bodie was born at Pittsburgh, Pa., and received his higher education at Johns Hopkins University. He entered railway service as a clerk in the car service department of the Baltimore & Ohio at Baltimore, Md., in 1928, during school vacation. From June, 1930, to February, 1934, he was employed by various electrical companies, and in May, 1934, he entered the service of the Pennsylvania as a signalman's helper on the New York-Washington electrification project. In August, 1935, Mr. Bodie was appointed a rodman of the Alton, with headquarters at Bloomington, and on January 1, 1939, he was advanced to instrumentman, with the same headquarters. In July of the same year he was transferred to the office of the chief engineer at Chicago, and in August, 1940, he was promoted to assistant trainmaster of the Eastern division. On January 1, 1942, he was advanced to trainmaster of the Eastern division, holding that position until his new appointment became effective on December 1.

James F. Nellis, whose promotion to superintendent of the St. Louis Terminal division of the Wabash was reported in the January issue of *Railway Engineering and Maintenance,* was born at Detroit, Mich., on January 17, 1904, and received his education at the University of Detroit. He entered railway service with the Wabash in May, 1929, as a rodman, subsequently serving in various capacities in the engineering department until October, 1939, when he was promoted to acting assistant trainmaster of the St. Louis Terminal division. On April 1, 1940, he was advanced to trainmaster with headquarters as before at St. Louis, Mo. On March 1, 1942, Mr. Nellis was transferred to Montpelier, Ohio, and on May 11, 1943, he was appointed to division engineer, with headquarters at Decatur, Ill. On December 1, 1943, he was appointed trainmaster, with the same headquarters, holding that position until his new appointment became effective on December 6.

Charles B. Bryant, whose promotion to assistant to the vice-president of the Southern was reported in the December issue of *Railway Engineering and Maintenance,* was born in Washington on November 1, 1900. In 1922 he graduated in engineering from Johns Hopkins University. After eight years as a field engineer of the Portland Cement Association and six years as materials engineer of the Maryland State Road Commission, he entered railroad service on November 16, 1936, as engineer of tests of the Southern, with headquarters at Alexandria, Va., which position he held until his new appointment which became effective on December 1.

Charles B. Bryant

Bert J. Simmons, whose promotion to assistant to the general manager of the Western Pacific, with headquarters at San Francisco, Cal., was reported in the January issue, was born at Chicago on February 18, 1886. He entered railway service in February, 1904, in the engineering department of the Chicago & North Western at Chicago, becoming an instrumentman on the track elevation project of the Chicago Junction a year later. In November, 1906, Mr. Simmons entered the service of the Chicago, Indiana & Southern (now a part of the New York Central) as an instrumentman on construction, where he remained until April, 1907, when he became a rodman on maintenance of way on the Tennessee division of the Illinois Central. From October, 1908, to February, 1910, he was successively a topographer, estimator and levelman on preliminary and location surveys on construction on the Chicago, Rock Island & Pcific and on the St. Louis-San Francisco in Texas. From May, 1910, to the entry of the United States in the World War, Mr. Simmons was in turn transitman, assistant engineer, locating engineer and division engineer on location, construction and maintenance on the Coast Lines of the Atchison, Topeka & Santa Fe. He entered military service in June, 1917, as a captain and was later promoted to major, in the 18th Engineers, acting as project engineer and camp commander at Sulpice, France, and as superintendent of roads of Base Section No. 2. Mr. Simmons was discharged from the Army in May, 1919, and was soon after appointed division engineer on the Northwestern Pacific, later being advanced to engineer of maintenance of way and structures. In January, 1924, he was appointed assistant engineer on the Western Pacific, at San Francisco, and on June 1, 1927, he was promoted to the position he held at the time of his new appointment, which became effective on January 1, 1944.

Everette A. Craft, whose promotion to vice-president of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex., was reported in the January issue of *Railway Engineering and Maintenance,* was born at Danville, Ill., on September 11, 1893, and entered railway service in October, 1909, as a chainman on the Chicago & Eastern Illinois. He was later promoted to transitman and in 1914 he was advanced to assistant division engineer of the Evansville division, later being transferred successively to the Illinois and the Chicago divisions. In June, 1917 he was commissioned first lieutenant in the Engineer's Officers Reserve Corps, assigned with the 17th Engineers (Railway) at St. Nazaire, France. Mr. Craft was transferred to the Transportation Corps on November 1, 1917, and from January 1, 1918, to August, 1919, was a superintendent in the army transport service, receiving a commission as captain in October, 1918, and as major in February, 1919. After his discharge from the army he returned to the C. & E. I. as assistant engineer at Danville in October, 1919. In December, 1919, he went with the Southern Pacific Lines in Texas and Louisiana as division engineer of the El Paso division, with headquarters at El Paso, Tex., and four month later he

Everette A. Craft

was appointed assistant to the engineer maintenance of way, with headquarters at Houston. In September, 1920, he was appointed assistant to the chief engineer. Mr. Craft was advanced to engineer maintenance of way in October, 1926, and on March 16, 1939, he was promoted to the position he held at the time of his new appointment.

Chester A. Johnston, whose promotion to superintendent of transportation of the Wabash, with headquarters at St. Louis, Mo., was reported in the January issue, of *Railway Engineering and Maintenance,* was born at Logansport, Ind., on September 1, 1895, and received his education at Purdue University and the University of Arizona. He entered railway service in 1917 as an assistant on the engineering corps of the Pennsylvania with headquarters at Louisville, Ky., later serving in the same capacity at Indianapolis, Ind., and Terre Haute. In 1924 he became an assistant engineer on the Wabash, with headquarters at Decatur, Ill., and one year later he was advanced to resident engineer, with headquarters at Adrian, Mich. In 1927 Mr. Johnston was promoted to track supervisor of the Chicago Terminal division, with headquarters at Chicago, and in 1930 he was further advanced to division engineer of the Detroit division, with headquarters at Montpelier, Ohio. One year later he was promoted to superintendent of the Detroit division, with the same headquarters, and in 1932 he was appointed division engineer of the Montpelier division. In 1934 Mr. Johnston was advanced to superintendent of the St. Louis Terminal division, being transferred to the Montpelier division in 1936 and to the Decatur division in 1940, remaining in the latter location until his new appointment became effective on December 1.

Engineering

Joseph L. Loida, valuation engineer of the Illinois Terminal, with headquarters at St. Louis, Mo., has been promoted to assistant chief engineer, with the same headquarters.

R. H. Emmerson, has been appointed engineer, right of way, Atlantic region, of the Canadian National, suceeeding **A. S. Gunn,** whose promotion to principal assistant engineer was reported in the January issue of *Railway Engineering and Maintenance.*

J. A. Lippitt, architectural draftsman on the Atchison, Topeka & Santa Fe, Eastern Lines, with headquarters at Topeka, Kan., has been promoted to architect, Eastern Lines, with the same headquarters, succeeding **G. C. Lancaster,** whose recent death is reported elsewhere in these columns.

J. A. Stocker, district engineer of the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, has been appointed consulting engineer, with the same headquarters.

Edgar Bennett, assistant chief engineer of the Central Lines of the Southern, has been named chief engineer of maintenance of way, Central lines, with headquarters as before at Knoxville, Tenn. He succeeds **Harry E. Tyrrell,** whose death was announced in the January issue of *Railway Engineering and Maintenance.* **James S. Wearn,** roadmaster at Sheffield, Ala., succeeds Mr. Bennett as assistant chief engineer, with headquarters at Knoxville.

Frederick P. Barrick, assistant division engineer on the Chesapeake & Ohio, with headquarters at Russell, Ky., has been promoted to division engineer of the Ashland-Big Sandy divisions, with headquarters at Ashland, Ky., to succeed **P. L. Koehler,** whose appointment as trainmaster is noted elsewhere in these columns. **H. S. Purdom** has been appointed assistant division engineer at Russell to succeed Mr. Barrick.

Brewer C. Lawson, assistant engineer in the office of the chief engineer of the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo., has been promoted to valuation engineer, with the same headquarters.

Claude B. Bruner, office engineer of the Sacramento Northern (part of the Western Pacific), with headquarters at Sacramento, Cal., has been promoted to chief engineer of that subsidiary with the same headquarters, succeeding **Wellesley T. Richards,** who has been appointed division engineer of the Western Pacific, with headquarters at Sacramento, replacing **Alan F. Williams,** who has entered the armed forces.

Harley L. Vandament, district engineer of the Chesapeake & Ohio, whose promotion to principal assistant engineer was announced in the December issue of *Railway Engineering and Maintenance* was born at Hamersville, Ohio, on December 23, 1883. He received his civil engineering degree from Ohio State University in 1910, and entered railroad service in July, 1910, as a transitman for the Louisville & Nashville. In September of the same year he joined the Chesapeake & Ohio as an instrumentman, becoming acting resident engineer in July, 1912, resident engineer in April, 1916, and assistant engineer in December, 1922. Mr. Vandament was appointed district engineer in November, 1923, and held that position until his present promotion to principal assistant engineer, with headquarters at Richmond, Va.

George E. Robinson, whose promotion to assistant engineer of structures on the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, was reported in the January issue of *Railway Engineering and Maintenance* was born at Lowell, Mass., on March 5, 1896, and graduated in civil engineering from Worcester Polytechnic Institute in 1917. He entered railway service on August 24, 1917, in the chief engineer's office of the Big Four at Cincinnati, Ohio, and on October 23, 1917, he went with the U. S. Army, serving as a captain in the Engineering Corps. He returned to the Big Four on July 27, 1920, as a draftsman in the chief engineer's office, and a few weeks later he was promoted to assistant engineer of the Cincinnati-Sandusky division, with headquarters at Springfield, Ohio. Mr. Robinson was transferred to the P. & E. division at Indianapolis, Ind., on September 19, 1921, and on December 5, 1921, he was appointed a bridge designer in the chief engineer's office. On May 16, 1923 he was appointed assistant engineer of

G. E. Robinson

the Indianapolis Terminal division, with headquarters at Indianapolis, and on June 18, 1924, he was reappointed bridge designer in the chief engineer's office. Mr. Robinson was promoted to assistant engineer on April 12, 1926, with headquarters at Cincinnati, and in June, 1940, he was advanced to assistant engineer of structures, with the same headquarters. In October, 1942, he was transferred to Cleveland, remaining in that location until his new appointment became effective December 1.

Angus S. Gunn, whose promotion to principal assistant engineer on the Atlantic region of the Canadian National, with headquarters at Moncton, N. B., was reported in the January issue, was born at East River, St. Mary's, N.S., and entered the service of the Canadian National in September, 1913, as a draftsman in the engineering department. After serving in World War I he returned to the Canadian National in May, 1920, as an assistant engineer, and became construction engineer in June, 1929. In January, 1933, he was appointed engineer right of way, and held that position until his present appointment as principal assistant engineer of the Atlantic region with headquarters at Moncton.

Harold J. McKenzie, whose promotion to assistant chief engineer of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Houston, Tex., was reported in the January issue, was born at Houston on October 11, 1904, and graduated from Texas Agricultural and Mechanical College in 1927. Mr. McKenzie entered railroad service in the drafting department of the Texas and New Orleans in 1926, and from July, 1927, until March, 1936, he was employed in various progressive positions in the drafting department. In 1936 Mr. McKenzie was appointed chief draftsman, continuing in that position until March, 1939, when he was promoted to assistant

to the chief engineer. He served with that title until his recent appointment as assistant chief engineer at Houston.

Arthur Price, assistant division engineer of the Delaware and Susquehanna divisions of the Erie, with headquarters at Hornell, N.Y., has been promoted to division engineer of the Wyoming and Jefferson divisions, with headquarters at Dunmore, Pa., to succeed **Louis Rossman,** who has been transferred to the Marion division, with headquarters at Huntington, Ind. Mr. Rossman replaces **L. H. Jentoft,** who has been transferred to Salamanca, N.Y., with jurisdiction over the Alleghany, Bradford, Meadville and B. & S. W. divisions, succeeding **O. N. Lackey,** who has been appointed assistant division engineer at Huntington to replace **F. A. Roberts,** who, at his own request, has been appointed supervisor of track, as noted elsewhere in these columns. All these changes became effective on January 16.

G. T. Donahue, assistant district engineer on the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, has been promoted to district engineer, with the same headquarters, succeeding **J. A. Stocker,** who has been assigned to other duties. **R. R. Smith,** division engineer, with headquarters at Toledo, Ohio, has been advanced to assistant district engineer, with headquarters at Cleveland, replacing Mr. Donahue. **E. G. Brisbin,** assistant division engineer on the Michigan Central, at Bay City, Mich., has been promoted to division engineer, with headquarters at Jackson, Mich., relieving **C. W. Strattman,** who has been transferred to the New York Central, Lines West of Buffalo, with headquarters at Toledo, succeeding Mr. Smith. **J. W. Westwood,** supervisor of bridges and buildings on the Michigan Central, at Detroit, has been advanced to assistant division engineer, with headquarters at Bay City, replacing Mr. Brisbin.

Track

D. S. Davidson, roadmaster on the Canadian National, with headquarters at Winnipeg, Man., retired recently.

C. J. Gardner, roadmaster on the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., has been transferred to Chickasha, Okla., succeeding **G. W. Runnels,** who has been transferred to El Reno.

J. P. Morrissey, track supervisor on the Wyoming division of the Erie, with headquarters at Dunmore, Pa., has been transferred to Warsaw, N.Y., to succeed **W. R. Worthington,** who has been transferred to the Delaware division, with headquarters at Callicoon, N.Y., to replace **L. E. Rodgers,** who has been transferred to Subdivision No. 1 of the Kent division, with headquarters at Kent, Ohio. Mr. Rodgers replaces **J. W. Weaver,** who has been transferred to Subdivision No. 3 of the Kent division, with headquarters at Marion, Ohio, to succeed **F. W. Holland,** who has been assigned to other duties because of ill health. **J. T. Flynn,** general foreman at Buffalo, N.Y., has been promoted to supervisor of track, with headquarters at Dunmore, to succeed Mr. Morrissey, and **John Krizman,** track supervisor at Huntington, Ind., has been appointed general foreman at Buffalo to replace Mr. Flynn. **F. A. Roberts,** assistant division engineer at Huntington, has, at his own request, been appointed track supervisor with the same headquarters to succeed Mr. Krizman. All these changes became effective on January 16.

Randle T. Henderson, whose promotion to roadmaster on the Southern Pacific, with headquarters at Niles, Cal., was reported in the November issue of *Railway Engineering and Maintenance* was born in England on November 28, 1903, and entered railway service on August 14, 1928, as a laborer on the Southern Pacific. He subsequently served as trackwalker, assistant foreman, rotary snowplow operator and timekeeper at various points on the road until 1937 when he was promoted to foreman, with headquarters at Eder, Cal. In 1941 Mr. Henderson was appointed roadmaster's clerk at Marysville, Cal., and on March 4, 1942, he was advanced to general foreman, with headquarters at Oakland, Cal.

Harry J. McNally, whose promotion to supervisor of track on the St. Louis division of the Pennsylvania, with headquarters at Greenville, Ill., was reported in the December issue, was born at Philadelphia, Pa., on June 6, 1914, and graduated from Lehigh University, Bethlehem, Pa., in 1937. He entered railway service with the Pennsylvania in June, 1937, as an engineering apprentice, with headquarters at Wilmington, Del., and in the same year he was advanced to assistant on the engineering corps, with headquarters at Downingtown, Pa. A short time later he was transferred to Philadelphia and then to Sunbury, Pa. On February 17, 1941, Mr. McNally was appointed assistant supervisor of track on the Eastern division, with headquarters at Alliance, Ohio, holding that position until his new appointment became effective on November 11.

Luther W. Hogston, whose promotion to supervisor of track on the Pennsylvania, with headquarters at Wheeling, W. Va., was reported in the December issue of *Railway Engineering and Maintenance* was born at New Paris, Ohio, on September 18, 1906, and entered railway service with the Pennsylvania as a trackman, subsequently serving as machine operator, track foreman and extra gang foreman at various points on the road. On August 10, 1939, he was promoted to general foreman, with headquarters at Columbus, Ohio, and one year later he was advanced to acting supervisor of track, with headquarters at Cadillac, Mich. On November 1, 1940, Mr. Hogston was promoted to assistant supervisor of track on the Chicago Terminal division, with headquarters at Chicago, and on June 1, 1941, he was transferred to the Middle division, with headquarters at Altoona, Pa.

Bridge and Building

J. D. Fraser, assistant supervisor of bridges and buildings on the Michigan Central, with headquarters at Detroit, Mich., has been advanced to supervisor of bridges and buildings, with the same headquarters, succeeding **J. W. Westwood,** whose promotion to assistant division engineer, with headquarters at Bay City, Mich., is reported elsewhere in these columns.

Charles R. Richards, assistant supervisor of bridges and buildings of the Boston division of the Boston & Albany (part of the New York Central System), whose promotion to supervisor of bridges and buildings of that division, with headquarters at Allston (Boston), Mass., was noted in the October issue, was born on August 27, 1888, at Worcester, Mass. Mr. Richards entered railway service with the Boston & Albany on January 19, 1911, as a bridge worker. Two years later he was advanced to bridge foreman in charge of a crew of iron workers, which position he held until July 15, 1931, when he was promoted to assistant supervisor of bridges and buildings at Worcester. He was holding this position at the time of his recent appointment as supervisor of bridges and buildings.

Special

J. A. Guttilla, track supervisor of the LaCrosse division of the Chicago, Burlington & Quincy, with headquarters at LaCrosse, Wis., has been promoted to assistant supervisor of safety, with headquarters at Chicago, a newly-created position.

Obituary

John F. Forst, supervisor of track on the Pittsburgh & Lake Erie, with headquarters at Beaver Falls, Pa., died on December 31, at the age of 64 years.

F. H. Natzel, roadmaster on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Montevideo, Minn., died in that city on December 21.

Floyd Earney, roadmaster on the Missouri Pacific at Eudora, Ark., died recently in a hospital in Little Rock, Ark.

Norman Ross, who retired in 1932 as supervisor of bridges and buildings of the Southern Pacific, with headquarters at Portland, Ore., died in that city recently.

G. C. Lancaster, architect on the Atchison, Topeka & Santa Fe, Eastern Lines, with headquarters at Topeka, Kan., died in that city recently.

Michael E. Loftus, who retired in 1937 as roadmaster on the Missouri-Kansas-Texas, with headquarters at Muskogee, Okla., died in a hospital at Parsons, Kan., recently.

Orville V. Chesney, who retired in 1935 as supervisor of bridges and buildings on the Southern Pacific, with headquarters

at Portland, Ore., died at his home in Medford, Ore., on January 8.

Francis Boardman, assistant manager of the Grand Central terminal, New York, whose death on December 12 was reported in the January issue, was born at Rutland, Vt., on August 15, 1875, and entered the service of the New York Central 43 years ago as a chainman at Buffalo, N.Y. In August of the same year he was transferred to Hudson, N.Y., as assistant supervisor of track. His next position was that of assistant engineer and supervisor of track at White Plains, N.Y., where he served until 1904. He was then named assistant engineer, two years later becoming designing engineer and division engineer. In 1923 Mr. Boardman was appointed building manager, Grand Central terminal, and in February, 1926, was named to the position of assistant manager of the terminal. He was serving in this capacity at the time of his recent death.

Edward W. Deuel, superintendent of the Pueblo division of the Denver & Rio Grande Western, with headquarters at Pueblo, Colo., and a maintenance officer by training and experience, died in a hospital at Denver, Colo., on January 8. Mr. Deuel was born at Grand Island, Neb., on January 1, 1874, and entered railway service in August, 1896, as a toolman of the Union Pacific, later serving in various supervisory capacities on that road. In 1906 he went with the Denver & Rio Grande (now the D. & R. G. W.) as roadmaster, with headquarters at Durango, Colo., and in 1909 he was advanced to assistant division superintendent at Alamosa, Colo. Later he served as division superintendent at Gunnison, Colo., and Salt Lake City, Utah.

William L. Roller, division engineer on the Chesapeake & Ohio, with headquarters at Columbus, Ohio, died at his home in that city on November 19 following an extended illness. Mr. Roller was born at Elgin, Ohio, on February 22, 1881, and graduated from Ohio State University in 1906. He entered railway service in September, 1907, as a rodman on the Hocking Valley (now part of the C. & O.), at Logan, Ohio. In August, 1909, he was promoted to assistant engineer, with the same headquarters, and in June, 1910, he was transferred to Columbus, Ohio. In April, 1915, Mr. Roller was appointed resident engineer on construction of the C. & O. line between Limeville, Ky., and Waverly, Ohio, and two years later he returned to the Hocking Valley as assistant engineer of construction. In October, 1925, he was promoted to engineer maintenance of way, and in May, 1930, he was appointed division engineer on the C. & O., the position he held at the time of his death.

Horace E. Newcomet, vice-president, Western region, of the Pennsylvania, with headquarters at Chicago, and an engineer by training and experience, died on January 14, following a lengthy illness. Mr. Newcomet was born at Philadelphia, Pa., on April 27, 1874, and graduated from the University of Pennsylvania. From 1897 to 1901, he served successively as acting assistant engineer on the Cleveland and Pittsburgh division and assistant engineer maintenance of way on the Cincinnati division. For the following 12 years he was engineer maintenance of way of the Indianapolis and Vincennes division, the Cincinnati division and the Erie and Ashtabula division and division engineer of the Cleveland and Pittsburgh division. He was promoted to superintendent of the Louisville division in January, 1913, and was transferred to the Logansport division in March, 1918, and to the Cleveland

Horace E. Newcomet

and Pittsburgh division in March, 1920. Three years later he was promoted to general superintendent of the Lake division, with headquarters at Cleveland, Ohio, then being further promoted to general manager of the Western region, with headquarters at Chicago, in September, 1926. On June 12, 1929, Mr. Newcomet was elected to the position he held at the time of his death.

Supply Trade News

General

The management and employees of the **Mall Tool Company,** Chicago, have been awarded a star to add to their Army-Navy "E" flag for "continuing their production in such volume as to justify this renewal of their award."

Personal

John P. Roche, counsel and assistant secretary of the **Oliver Iron & Steel Corp.,** Pittsburgh, Pa., has also been appointed assistant to the president and **E. C. Eaglen** has been placed in charge of market research.

Ford Brown, assistant manager of the Milwaukee (Wis.) branch of the **Blackmer Pump Company,** Grand Rapids, Mich., has been transferred to Minneapolis, Minn., where he is in charge of pump and accessory sales in Minnesota, North and South Dakota and Northern Wisconsin.

H. N. Arbuthnot, assistant general manager of sales for the **Allegheny Ludlum Steel Corporation,** Brackenridge, Pa., has been promoted to regional manager of the Detroit territory, with headquarters at Detroit, Mich., a newly-created position.

James G. Graham and **Edward M. Welty** have been appointed general manager of sales and assistant general manager of sales respectively of the Industrial Fastener division of the **Oliver Iron & Steel Corp.,** Pittsburgh, Pa. **Bennett W. Johnson** and **Bernard J. Beck** have been appointed general manager of sales and general production manager respectively of the Pole Line Hardware division.

James A. Dwyer has been appointed general manager of sales and branches of the **Crane Company** with headquarters in Chicago. Mr. Dwyer joined the Crane organization in 1917 at the Philadelphia, Pa., branch. He has been successively estimator, salesman, chief clerk, branch sales manager, assistant branch manager, branch manager, and district manager. He was appointed manager of branch houses about a year ago and will continue in that capacity in addition to assuming his new duties.

Melvin J. Rotroff has been appointed district manager, Chicago and Mississippi Valley area, for the **Oxweld Railroad Service Company,** a unit of Union Carbide & Carbon Corporation. Mr. Rotroff began his career as a machinist at the

Melvin J. Rotroff

Lima, Ohio shops of the Lake Erie & Western (now part of the New York, Chicago & St. Louis) and later took training in oxy-acetylene welding. He joined the Oxweld Railroad Service Company in 1928, serving as instructor at various points on the Reading, and later as district superintendent of the Eastern division. For the last four years he has been assistant general superintendent, with headquarters in Chicago.

O. O. Lewis, branch manager at the Atlanta, Ga., office of **Fairbanks, Morse & Company,** has been promoted to assistant general sales manager with headquar-

(Continued on page 150)

★ FIRST ON THE RAILS, AND STILL FIRST ★

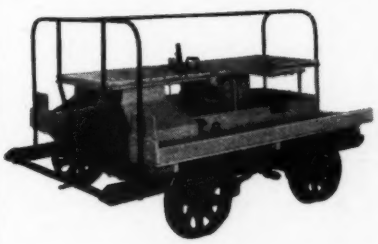
Designed by Men Who Know Railroading

Fairbanks-Morse Sheffield and Eclipse Motor cars are still first on the rails because they have *all* of the features a car should have . . . and all of those features are *good.*

There are 12 models—water cooled, air cooled, chain drive, belt drive. *Eclipse* models are belt-driven. *Sheffield* Models are chain-driven.

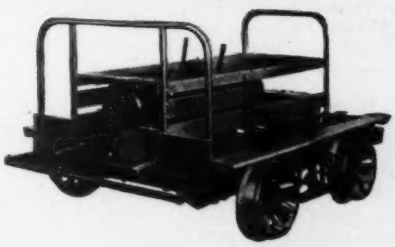
Sheffield Model 40B with cab

Two-cylinder air-cooled engine permits full load operation for hours without overheating. Engine develops exceptionally high torque at low speeds. Friction transmission. Chain drive. Steel frame. Thousands in service.



Sheffield Model 40B with special safety railing

Sheffield Model 53
Weighs 929 pounds with rear end lift of only 124 pounds. Has 8- to 13-hp., water-cooled motor with air-cooled head. Space for full section gang and tools.



Buy War Bonds

FAIRBANKS, MORSE & CO.

FAIRBANKS-MORSE BUILDING, CHICAGO, ILL.

RAILROAD SALES OFFICES: NEW YORK • BOSTON • CHICAGO • ST. LOUIS • ST. PAUL
CINCINNATI • ATLANTA • NEW ORLEANS • DALLAS • SAN FRANCISCO

Export Division: 80 Broad Street, New York City

Canada: Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Winnipeg

ters at Chicago and **G. N. Van Epps,** manager of the Diesel department at Chicago, has been promoted to branch manager at Atlanta to succeed Mr. Lewis. **V. O. Harkness,** manager of the company's branch at Dallas, Tex., has been appointed manager of the Diesel engine sales division at Chicago, and **H. J. Renken,** manager of the oil field division at Dallas, will succeed Mr. Harkness as manager in that city. **J. S. Peterson,** scale department manager of the Cincinnati, Ohio, branch, has been promoted to the office of branch manager to succeed the late Stanley Eaton.

A. C. Lewis, whose appointment as vice-president in charge of sales of **Templeton, Kenly & Co.,** Chicago, was reported in the January issue, entered the employ of Templeton, Kenly in 1912 and later opened a Canadian plant in Toronto, Ont., for the manufacture of the company's jacks. When Canadian manufacturing was discontinued temporarily in 1915 and the plant's equipment was sold, Mr. Lewis resigned to form the A. C. Lewis Company, Ltd., Canadian distributor for Simplex jacks. In 1917 he became an officer in the Third Canadian Infantry battalion, Toronto regiment, in France and upon being wounded at Amiens on August 8, 1918, was removed to a hospital in Canada. Upon being discharged from the hospital, he returned to his business. When, in 1928, the Railway & Power Engineering Corp., Ltd., took over the assets of A. C. Lewis Company, Ltd., including the distribution of Templeton, Kenly & Co. products, Mr. Lewis was made special representative of the sales department, which position he has held until his recent election.

Obituary

L. P. Bowen, representative of the Railway department of the Dearborn Chemical Company, Chicago, died on December 17.

John A. McCormick, chairman of the Independent Pneumatic Tool Company, died on December 30.

Percy E. Hoak, president of the Wheeler Lumber & Supply Co., Des Moines, Ia., died in Miami, Fla., on December 4.

David W. McNaugher, vice-president and treasurer of the Robert W. Hunt Company, whose death on November 24 was reported in the January issue, was born in 1859 and graduated from Westminster College in 1881 and from Rensselaer Polytechnic Institute in 1885. He began his career as an engineer as a member of the engineering firm of G. W. G. Ferris & Co., which, after the death of Mr. Ferris, became the Hallsted & McNaugher Co. In 1900, when this company was merged with the Robert W. Hunt Company, Mr. McNaugher was elected vice-president and treasurer, which position he held until his death.

Walter H. Hinsch, chief engineer of the Dearborn Chemical Company, Chicago, and a lieutenant-colonel in the 267th Field Artillery, whose death on November 15th was reported in the December issue, was born at Chicago on December 28, 1895, and studied mechanical engineering at night school. He entered railway service in 1912 with the Chicago & North Western and served as a detailer and designer in both the locomotive and car departments. During World War I he served in the U. S. army, advancing to second lieutenant of field artillery. In 1920 he went with the Amer-

Lt. Col. Walter H. Hinsch

ican Steel Foundries as a designer of freight and passenger car appliances and in 1924 he went with the Locomotive Firebox Company as chief draftsman, later being advanced to assistant to the mechanical engineer. Mr. Hinsch went with the Dearborn Chemical Company in 1936 as chief engineer in charge of the design and installation of wayside water treatment plants and equipment. After World War I, Mr. Hinsch had retained his commission in the Officers Reserve Corps and he re-entered the service on January 16, 1942, as a major in the field artillery, taking leave of absence from the Dearborn Chemical Company for this purpose. He was accidentally killed during maneuvers at Camp Van Dorn, Miss., on November 15.

Walter A. Rogers, chairman of the board of the Bates & Rogers Construction Corp., Chicago, died in that city on January 3 of a heart ailment. Mr. Rogers was born at Milwaukee, Wis., on January 19, 1868, and graduated in civil engineering from the University of Wisconsin in 1888. He entered railway service in the engineering department of the Wisconsin Central (now part of the Minneapolis, St. Paul and Sault Ste. Marie), in 1890, later serving successively in the engineering departments of the Northern Pacific and the Chicago, Milwaukee & St. Paul (now the Chicago, Milwaukee, St. Paul & Pacific), becoming engineer of permanent construction of the latter road. In 1901 Mr. Rogers resigned from the Milwaukee to form the Bates & Rogers Construction Corp., and in 1938 he retired as president of that company, remaining active in its affairs as chairman of the board of directors. Mr. Rogers was long active in the American Railway Bridge and Building Association and served as president of that organization in 1901-1902.

Association News

Railway Tie Association

The Executive committee met at Savannah, Georgia, on January 28, to formulate the program for the annual meeting which will be held at the Netherland Plaza Hotel, Cincinnati on May 16-17.

Bridge and Building Association

President J. L. Varker and his associates on the Executive Committee are completing the organization of technical committees, the personnel of which will be published in the next issue. Several of the committees have perfected their organizations and are already engaged in their work.

Metropolitan Maintenance of Way Club

The next meeting of the club will be held on Friday evening, February 25, at the Hotel Governor Clinton, New York. Following dinner, the meeting will be addressed by Harcourt C. Drake, director of research, Sperry Rail Service, whose paper will be entitled "Rail Defects—Some Present-Day Aspects of This Growing Problem." Mr. Drake's comments will be illustrated with slides.

Wood Preservers' Association

Members of the Executive Committee met in Chicago on January 19, to formulate the program for the fortieth annual meeting. This meeting will be held at the Palmer House, Chicago, on April 26 and will again be confined to one day, with morning and afternoon sessions. Elaborating on the program of last year, which was confined to the presentation of committee reports, the program for this year will be supplemented by a number of papers prepared by individuals which, with the committee reports, will be prepared and distributed to members in advance of the meeting.

American Railway Engineering Association

As announced in the January issue, the association, after missing its annual meetings in 1943, will meet in the Palmer House, Chicago, on March 14-16. The program for the meeting, which is already well advanced, will include the presentation of committee reports, but will be highlighted throughout by special features and addresses giving consideration to specific problems rising out of the war and to future problems with which engineering and maintenance officers will be faced incident to postwar adjustments and developments.

With the year's work of committees either completed or drawing to a close, only one committee has scheduled a meeting during February, this being the Committee on impact, which will meet in Chicago on February 16. The only committee to hold a meeting in January was the Committee on Economics of Railway

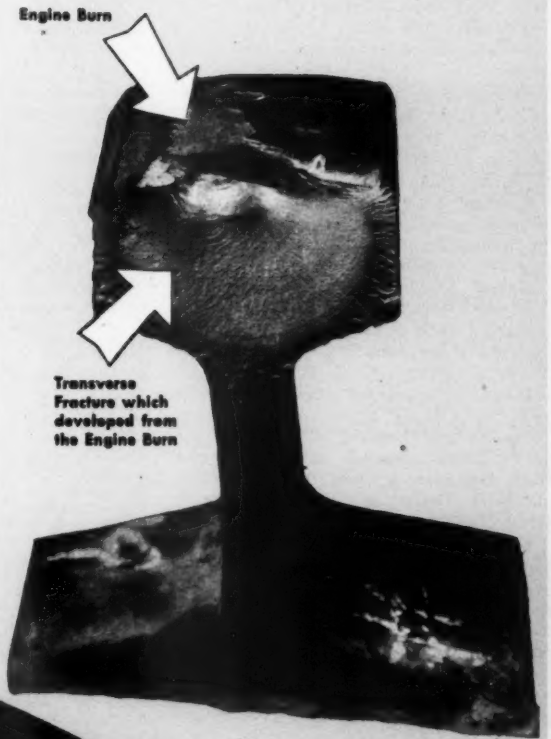
(Continued on page 152)

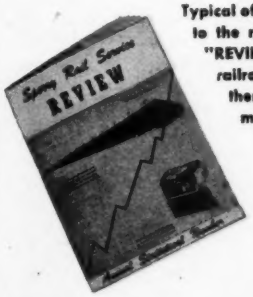
Sperry's CONTRIBUTION TO TRACK SAFETY...

In 1943 Sperry's fleet detected over 111,000 defective rails on approximately 80 railroads in the United States and Canada . . . the removal of these hazards was an unquestionable contribution to *track safety.*

Sperry's record and reputation for having the most efficient rail testing equipment and service is the result of continued research and field experience gained in testing over a million miles of rail in track during the last 15 years.

ENGINE BURN FRACTURE





Typical of the information and service given to the railroads served by Sperry is the "REVIEW" which is mailed to interested railroad personnel, in order to keep them informed on rail-testing developments, practices, and procedures.

SPERRY *Rail Service*

HOBOKEN N J CHICAGO ILL

Location and Operation, which met in Chicago on January 26.

During the last month, Bulletin No. 443 was mailed to members, and about February 15 they will receive Bulletin No. 444, which will include reports of the committee, on Ties, Wood Preservation, Roadway and Ballast, Track and Rail.

As the result of the action of the Nominating committee of the association, the following names will appear on the ballot for officers to be mailed shortly to members: President, F. R. Layng, chief engineer, Bessemer & Lake Erie, Greenville, Pa.; vice-president, J. B. Akers, assistant chief engineer, Southern, Washington, D. C.; directors (three to be elected), J. E. Teal, transportation engineer, Chesapeake & Ohio, Richmond, Va.; C. C. Williams, president, Lehigh University, Bethlehem, Pa.; I. H. Schram, acting chief engineer maintenance of way, Erie, Cleveland, Ohio; Barton Wheelwright, chief engineer, Canadian National Railways, Toronto, Ont.; S. E. Armstrong, engineer maintenance of way, New York Central System, New York; H. A. Cassil, chief engineer, Pere Marquette, Detroit, Mich.; W. H. Penfield, chief engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago; J. F. Leonard, engineer of bridges and buildings, Pennsylvania, Pittsburgh, Pa.; and C. H. Mottier, chief engineer, Illinois Central System, Chicago.

For members of the Nominating committee (five to be elected): G. M. O'Rourke, assistant engineer maintenance of way, Illinois Central System, Chicago; C. A. Knowles, assistant to vice-president, Chesapeake & Ohio, Richmond, Va.; W. J. Headley, construction engineer, Wabash, St. Louis, Mo.; L. H. Laffoley, assistant engineer of buildings, Canadian Pacific, Montreal, Que.; H. L. Stanton, assistant chief engineer-signals, Pennsylvania, Philadelphia, Pa.; E. C. Vandenburgh, engineer of maintenance, Chicago and North Western, Chicago; C. H. Blackman, chief engineer, Louisville & Nashville, Louisville, Ky.; K. O. Ferris, chief engineer, Delaware and Hudson, Albany, N. Y.; J. B. Myers, engineer of roadway and track, Baltimore & Ohio, Baltimore, Md.; and B. W. DeGeer, engineer water service, Great Northern, St. Paul, Minn.

In addition to the above names to be balloted upon, A. A. Miller, chief engineer maintenance of way and structures, Missouri Pacific, St. Louis, Mo., will be advanced automatically to the position of senior vice-president.

Maintenance of Way Club of Chicago

Breaking all attendance records, 252 members and guests were in attendance at the meeting of the club on the evening of January 24. The feature of the meeting was the showing of the film that was taken on and is being used by the New York Central System as an aid in training employees in recommended rail-laying practices. The film was introduced by C. B. Bronson, inspecting engineer of the road, who also conducted a discussion session following its presentation.

At the next meeting of the club, which will be held on the evening of February 28, F. G. Campbell, assistant chief engineer of the Elgin, Joliet and Eastern, will discuss, assisted by motion pictures, his road's recent installation of long, butt-welded rails.

Roadmasters' Association

The personnel of committees has now been completed and President E. L. Banion has released them for publication as follows:

No. 1—Operation and Maintenance of Work Equipment—W. H. Moore (Chairman), supvr. wk. equip., Sou., Charlotte, N.C.; A. H. Whisler (Vice-Chairman), asst. engr. m. of w., P. R. R., Philadelphia, Pa.; F. H. McKenney, dist. engr., m. of w., C. B. & Q., Omaha, Neb.; A. E. Botts, asst, engr. m. of w., C. & O., Richmond, Va.; W. E. Chapman, div. engr., C. of Ga., Columbus, Ga.; C. F. Edwards, asst. div. engr., C. & O., Columbus, Ohio; E. E. Edwards, sec. fore., S. P., Medford, Ore.; W. L. Fowler, div. rdm., D. M. & I. R., Two Harbors, Minn.; E. M. Gambill, rdm., A. T. & S. F., Marceline, Mo.; Cornell Halverson, div. rdm., G. N., Grand Forks, N.D.; E. B. Harris, gen. supvr. wk. equip., S. A. L., Hamlet, N.C.; A. L. Kleine, div. engr., D. & R. G. W., Grand Junction, Colo.; F. H. Masters, ch. engr., E. J. & E., Joliet, Ill.; B. F. Myers, rdm., G. C. & S. F., Dallas, Tex.; Leonard E. Smith, rdm., M. P., St. Louis, Mo.; H. L. Standridge, rdm., C. R. I. & P., Fairbury, Neb.; M. C. Taylor, supvs. of wk. equip., L. & N., Louisville, Ky.; I. D. Talmadge, dist. engr., N. Y. O. & W., Middletown, N.Y.

No. 2—Effect of Traffic on the Service Life of Ties and Methods of Protection—W. T. Donoho (Chairman), dist. engr., G. C. & S. F., Galveston, Tex.; J. E. Fanning, (Vice-Chairman), asst. to ch. engr., I. C., Chicago; F. G. Campbell, asst. ch. engr., E. J. & E., Joliet, Ill.; R. E. Cramer, research engr., U. of I., Urbana, Ill.; R. L. Fox, rdm., Sou., Alexandria, Va.; E. J. Haley, gen. rdm., A. C. L., Waycross, Ga.; C. H. Hardwick, engr. m. of w., C. R. I. & P., Chicago; A. J. Johnson, rdm., C. & N. W., Huron, S.D.,; John B. Kelly, gen. rdm., Soo Line, Stevens Point, Wis.; H. E. Kirby, asst. engr., C. & O., Richmond, Va.; L. M. Kuhn, asst. supvr., R. F. & P., Richmond, Va.; F. J. Meyer, ch. engr., N. Y. O. & W., Middletown, N.Y.; R. H. Milliken, rdm., C. P. R., Trenton, Ont.; P. F. Muller, rdm., C. & W. I., Chicago; Philip O'Reilly, trk. supvr., N. Y. N. H. & H., Bridgeport, Conn., E. J. Ryan, trk. supvr., D. & H., Plattsburg, N.Y.; J. A. Rust, rdm., Sou., Winston-Salem, N. C.; Lee Spencer, Phoenix, Ariz.; A. W. Wehner, rdm., S. P., Lake Charles, La.

No. 3—Prevention of Accidents to Trackmen—J. T. Shepherd, Jr. (Chairman), rdm., N. & W., Buena Vista, Va.; J. C. Jacobs (Vice-Chairman), div. engr., I. C., Water Valley, Miss.; W. H. Sparks, gen. insp. trk., C. & O., Russell, Ky.; G. B. Aydelott, rdm., D. & S. L., Sulphur Springs, Colo.; M. R. Black, insp. of safety, L. & N., Corbin, Ky.; W. A. Davidson, rdm., U. P., Grand Island, Nebr.; J. F. Foley, rdm., C. B. & Q., St. Joseph, Mo.; J. H. Gibbs, rdm., M. P., Coffeyville, Kans.; J. G. Gilley, div. engr., C. & O., Richmond, Va.; Walter Lakoski, div. engr., C. M. St. P. & P., Mason City, Ia.; Geo. W. Lentell, trk. supvr., N. Y. N. H. & H., Taunton, Mass.; G. B. McClellen, gen. rdm., T. & P., Alexandria, La.; G. P. Palmer, engr. maint. & con., B. & O. C. T., Chicago; T. L. Robinson, gen. supvr., A. & E. C., New Bern, N.C.; R. B. Rust, Jr., supvr., Sou. Chattanooga, Tenn.; V. P. Shepardson, rdm., T. C. I. & R., Ensley, Ala.; G. E. Stewart, asst. div. engr., S. P., Portland, Ore.; Harold D. Van Vranken, asst. div. engr., S. A. L., Jacksonville, Fla.; Fred E. Wall, asst. div. engr., Alton, Bloomington, Ill..

No. 4—Mechanization of Section Gangs—T. O. Manion (Chairman), div. engr., M. P., Little Rock, Ark.; Charles Weiss (Vice-Chairman), supvr., P. R. R., Valparaiso, Ind.; T. N. Turner, rdm., M. P., Newport, Ark.; J. S. Anthony, trk. supvr., Sou., Strasburg, Va.; C. E. Brown, rdm., P. & S. F., Slaton, Tex.; A. B. Chaney, dist. engr., M. P., Little Rock, Ark.; B. Clark, trk. supvr., C. & E. I., Watseka, Ill.; J. Clark, supvr., C. C. C. & St. L., Indianapolis, Ind.; R. H. Gilkey, div. engr., C. of Ga., Savannah, Ga.; W. H. Haggerty, trk. supvr., N. Y. N. H. & H., New Rochelle, N.Y.; L. V. Johnson, mtce. engr., Soo Line, Minneapolis, Minn.; R. Marshall, dist. rdm., G. N., Superior, Wis.; H. P. Mason, trk. supvr., B. & M., Boston, Mass.; A. G. Reese, dist. mtce. engr., C. B. & Q., Galesburg, Ill.; J. C. Runyon, supvr. trk., C. & O., Covington, Ky.; E. C. Shreve, div. engr., W. M., Cumberland, Md.; R. E. Vandivort, rdm., P. & L. E., Pittsburgh, Pa.; and J. S. Vreeland, assoc. ed., *Railway Engineering and Maintenance*, Chicago.

No. 5—What the Trackman Can Do to Speed Up Train Operation—F. J. Liston (Chairman), asst. supt., C. P. R., Smith's Falls, Ont.; L. J. Gilmore (Vice-Chairman), gen. rdm., G. N., Spokane, Wash.; W. O. Frame, supt., Ft. Worth & Denver City, Wichita Falls, Tex.; W. E. Amburgey, supvr. trk., C. & O., Mt. Sterling, Ky.; Leo C. Blanchard, rdm., C. M. St. P. & P., Spencer, Ia., Armstrong Chinn, gen. mgr., Alton, Chicago; E. E. Crowley, rdm., D. & H., Albany, N. Y.; M. H. Dick, eastern ed., *Railway Engineering and Maintenance*, New York; E. A. Eastin, supvr., of trk., C. & O., Peru, Ind.; H. C. Fox, trk. supvr., Sou., Spartanburg, S.C.; A. B. Hillman, engr. m.of w., C. & W. I.-Belt Ry. of Chicago, Chicago; J. W. Hughes, gen. rdm., A. C. L., Florence, S.C.; R. L. Longshore, W. P., Oakland, Cal.; W. C. McCormick, rdm., S. A. L., Savannah, Ga.; J. M. Miller, asst, supt., W. M., Cumberland, Md.; George L. Morrison, div. engr., S. P., Ogden, Utah; C. L. Nolan, supvr., N. Y. C., Chicago; M. D. Packham, rdm., A. T. & S. F., Emporia, Kan.; W. F. Rambo, div. engr., M. P., Nevada, Mo.; F. E. Schaumburg, rdm., C. & N. W., DeKalb, Ill.

No. 6—Recruiting Men in the Face of a Labor Shortage—N. F. Alberts (Chairman), gen. fore. C. M. St. P. & P., Chicago; Neal D. Howard (Vice-Chairman) managing editor *Railway Engineering and Maintenance*, Chicago; E. J. Brown, engr. of trk., C. B. & Q., Chicago; B. S. Achibald, rdm., Ban. & Aroos., Derby, Me.; M. D. Carothers, ch. engr., Alton, Chicago; M. L. Denney, trk. supvr., Indianapolis Union, Indianapolis, Ind.; F. L. Etchison, gen, rdm., A. C. L., Rocky Mount, N.C.; John M. Fahey, rdm., C. & N. W., Winona, Minn.; F. C. Fisk, supvr., Erie, Hornell, N.Y.; H. B. Hoyt, trk. supvr., B. & O., E. Salamanca, N.Y.; P. L. Koehler, div. engr., C. & O., Ashland, Ky.; W. A. Moberly, rdm., C. M. St. P. & P., Chillicothe, Mo.; G. M. O'Rourke, asst. engr., m. of w., I. C., Chicago; B. F. Pennington, rdm., S. P., Marysville, Cal.; G. L. Sitton, ch. engr. m. of w. & s., Sou., Charlotte, N.C.; R. T. Spaulding, trk. supvr., B. & M., Worcester, Mass.; and W. P. Wiltsee, ch. engr., N. & W., Roanoke, Va.

Trade Publications

Booklet on Glass Blocks.—Methods of replacing windows with Insulux glass blocks are described in detail in a booklet published by the Insulux division of the Owens-Illinois Glass Company, Toledo, Ohio. The booklet contains 24 pages and includes photographs of typical installations as well as specifications, technical data and construction details. Among the advantages which the book claims for glass blocks are reduction in heat loss and gain, savings in critical materials, reduction in maintenance cost, elimination of infiltration of dirt and dust, and improved appearance.

Folder Features Jackson Tampers.—An eight-page folder featuring its line of Jackson vibratory tampers has been published by the Electric Tamper & Equipment Company, Ludington, Mich. Under a general heading of Fighting Freight Gets a Clear Track, the folder includes a number of unusually large illustrations of the Jackson WS-4 and WS-8 portable tamper power units as well as the various blades available for use with the tamper. Other illustrations show the tamper in actual use, while text stresses the use of the Jackson unit where increased railroad tonnage and speed necessitates heavier rail and better ballast.

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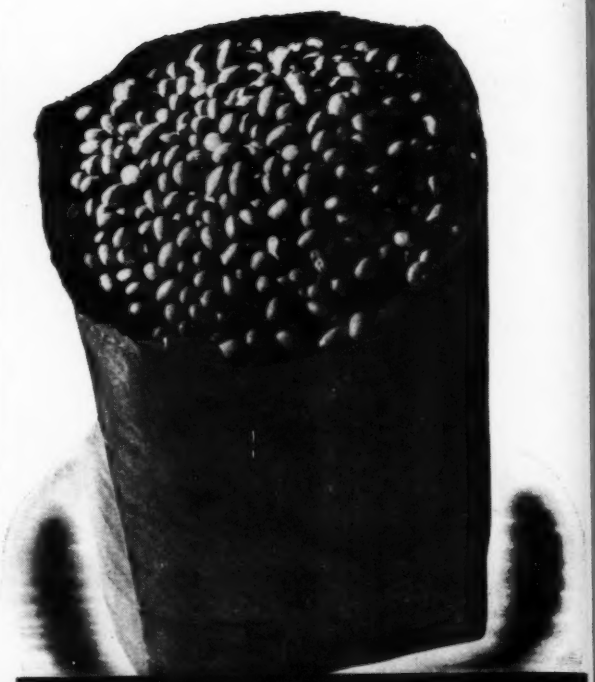

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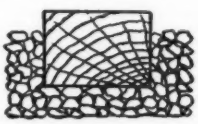

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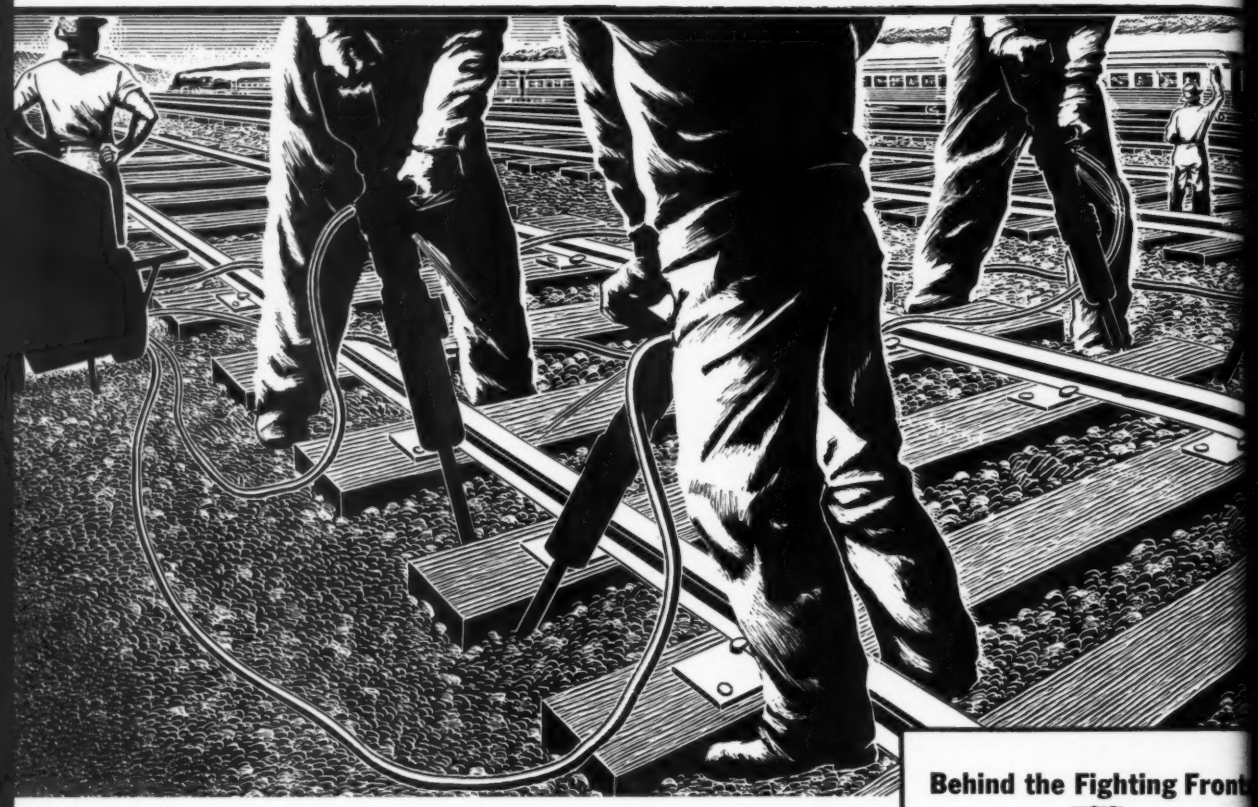

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